

GOVERNMENT OF INDIA

DEPARTMENT OF ARCHAEOLOGY

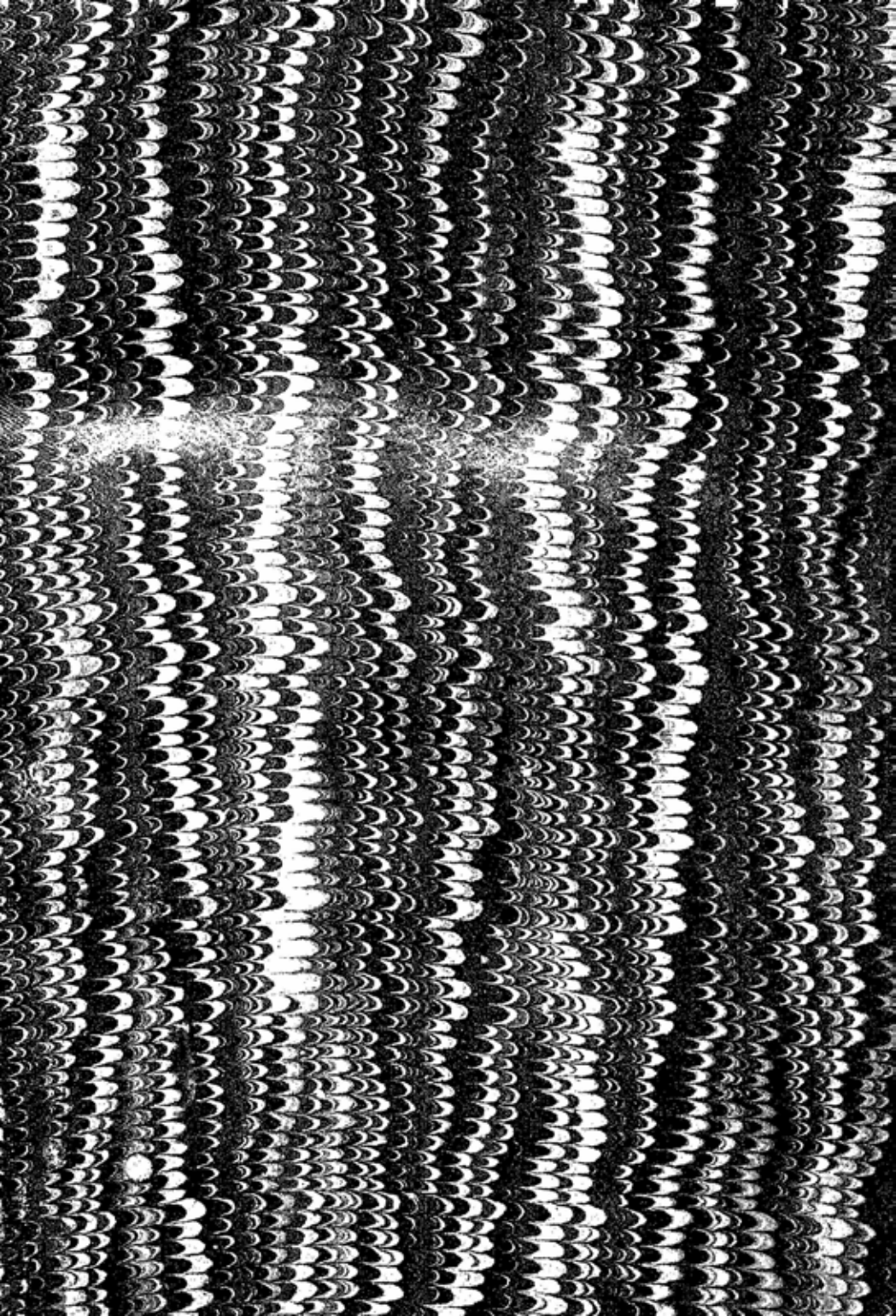
**CENTRAL ARCHAEOLOGICAL  
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[ APPENDIX. ]



ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1874.

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# STATEMENT

## *Abstract of the Cash Account*

RECEIPTS.		1874.	1873.
ADMISSION FEES.			
Received from Members,	Rs. 1,182 0 0	1,182 0 0	1,424 0 0
SUBSCRIPTIONS.			
Received from Members,	8,729 3 0	8,729 3 0	8,296 2 0
PUBLICATIONS.			
Sale proceeds of Journal and Proceedings	1,151 0 7		
Subscriptions to ditto	959 9 0		
Refund of Postage Stamps,	13 9 0		
Ditto of Packing Charges,	2 6 0		
		2,126 8 7	1,537 0 3
LIBRARY.			
Sale proceeds of Books,	400 2 0		
Refund of Freight,	7 5 6		
Ditto of Postage,	6 5 0		
		412 12 6	316 6 6
SECRETARY'S OFFICE.			
Saving of Salary,	18 10 3		
Received fine &c.,	4 3 6		
Refund of Postage Stamps,	0 15 0		
		23 12 9	9 3 9
VESTED FUND.			
Interest on the Government Securities from the Bank of Bengal,	449 0 0	449 0 0	238 4 0
BUILDING.			
Received from the Right Hon'ble the Secretary of State for India, being the Special House Allowance granted by Government of India from 1st December 1873 to 30th November 1874, @ 400 Rs. per month,	4,800 0 0	4,800 0 0	12,916 2 1
D. STOLICZKA MEMORIAL FUND.			
Received Subscriptions to the Fund,	1,240 0 0	1,240 0 0	
MISCELLANEOUS.			
Fund account,	220 3 7		
O. P. Fund,	641 1 5		
Yusuf Ali Munshee,	459 3 10		
Money Lal Bysack,	84 14 8		
F. S. Growse, Esq.,	8 0 0		
Lieut. W. A. Holcombe,	4 8 0		
Josim Dufory,	40 0 0		
Babu Rajendralala Mitra,	1 8 0		
Major G. E. Fryer,	1 0 0		
Rev. A. F. R. Hoernle,	2 14 0		
L. Schwendler, Esq.,	2 6 0		
E. C. Bayley, Esq.,	0 5 0		
Major J. W. H. Johnstone,	12 4 0		
	1,478 4 6		
Carried over, Rs. 18,963 4 16			



No. 1.

*of the Asiatic Society for 1874.*

PUBLICATIONS.		DISBURSEMENTS.		1874.	1873.
Paid Freight for sending Journal and Proceedings,	Rs.	83	5	0	
Ditto Lithographing and Engraving charges, &c.,		1,199	4	3	
Ditto Printing charges,		5,137	1	3	
Ditto Commission on sale of Books, &c.,		27	7	3	
Ditto Paper for Plates,		204	10	9	
Ditto Subscription to the Hindu Commentator,		10	0	0	
Ditto Purchase of Postage Stamps,		279	2	3	
Ditto Packing charges,		23	5	0	
Ditto Purchase of Journal,		18	0	0	
Ditto Stephen Austen, Esq. for Journal Part II, No. I of 1875, £40,		438	13	9	
Ditto Petty charges,		19	9	9	
				7,440	11 8 7,270 2 10
LIBRARY.					
Paid Salary of Librarian,		840	0	0	
Ditto Establishment,		120	0	0	
Ditto Commission on Sale of Books,		34	15	9	
Ditto Landing charges,		6	8	0	
Ditto Book Binding,		289	7	0	
Ditto Subscription to Medical Gazette,		15	0	0	
Ditto Salary of Punkhaman,		28	8	0	
Ditto Insufficient and Bearing Postage,		2	13	0	
Ditto Subscription to the Calcutta Review,		4	0	0	
Ditto Purchase of Books,		93	12	0	
Ditto Subscription to the Stray Feathers,		22	0	0	
Ditto Ditto to the Indian Antiquary,		3	8	0	
Ditto Lithographing charges,		10	0	0	
Ditto Extra attendance in the Library on the morning,		43	13	6	
Ditto Substantial Teak Wood,		67	12	0	
Ditto Freight,		2	5	0	
Ditto Mr. D. Garrick, for cleaning, repairing, restoring, re-bucking and varnishing 24 oil paintings,	1,065	0	0		
Ditto repairing wood works and finding Hook and Chain where required and hanging ditto,	69	0	0		
		1,134	0	0	
Ditto Petty charges,		13	12	6	
				2,732	2 0 1,518 13 11
SECRETARY'S OFFICE.					
Paid General Establishment,		390	0	0	
Ditto Secretary's Establishment,		2,018	0	0	
Ditto Purchase of Postage Stamps,		168	5	9	
Ditto Stationery,		35	9	9	
Ditto Insufficient and bearing Postage,		3	13	4	
Ditto Meeting charges,		141	5	0	
Ditto Commission on Subscriptions collected,		59	5	6	
		2,816	7	4	
Carried over,		Rs. 10,172		14	5

## RECEIPTS.

1874.

1873.

	Brought over, Rs.	1,478	4	6	18,963	4	10
T. W. H. Tolbert, Esq., .	.	2	5	0			
Babu Upendra Chandra Mukerjee, .	.	2	7	0			
J. Sime, Esq., .	.	0	8	0			
The Government of North Western Provinces,		10	2	0			
Lieut.-Col. F. W. Stubbs, .	.	8	6	0			
D. K. Pomeroy, Esq., .	.	3	9	0			
Thakur Giriprasad Sing, .	.	0	4	0			
Raja Joykissen Das Bahadur, .	.	0	4	0			
A. M. Broadley, Esq., .	.	43	0	0			
W. W. Hunter, Esq., .	.	0	4	0			
His Highness The Rao of Kutch, .	.	0	15	0			
W. Theobald, Esq., .	.	28	0	0			
James Beames, Esq., .	.	6	0	0			
E. T. Atkinson, Esq., .	.	15	1	0			
Archbold Constable, Esq., .	.	2	11	8			
C. W. Wilmot, Esq., .	.	0	15	0			
Lieut.-Col. W. E. Marshall, .	.	11	0	0			
J. G. Delmerick, Esq., .	.	7	4	0			
					1,621	4	2
						908	13 10

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 Carried over, Rs. 20,584 9 0

## DISBURSEMENTS.

1874.

1873.

Brought over, Rs.	2,816	7	4	10,172	14	5
Ditto Subscription to the Army List,	16	0	0			
Ditto Salary of Mali,	52	4	0			
Ditto Subscription to the Directory,	14	0	0			
Ditto Printing charges,	49	0	0			
Ditto a Copy of Postal Guide,	1	0	0			
Ditto Binding Paper Files,	5	0	0			
Ditto Ditto Ledgers,	47	6	0			
Ditto Freight,	2	8	0			
Ditto Pension to Islam Khan,	36	0	0			
Ditto Advertising charges,	23	4	0			
Ditto a full bound Blank Book,	6	12	0			
Ditto Printing Paper,	12	0	0			
Ditto Petty charges,	37	15	6			
				3,119	8	10
				2,614	0	4

## VESTED FUND.

Purchase of 5½ per cent. Government Security,	1,500	0	0			
Paid Interest on ditto,	22	0	0			
Ditto Premium on ditto,	118	2	0			
Ditto Commission ditto,	4	1	7			
Ditto Fee for renewing Government Security,	1	0	0			
Ditto Commission on collecting Interest on the Government Securities,	1	1	10			
				1,646	5	5
				5,975	9	11

## BUILDING.

Paid House rate,	384	0	0			
Ditto Police and Lighting rate,	216	0	0			
Ditto Water rate,	235	3	1			
Ditto Repairing charges,	84	10	9			
				919	13	10
				3,539	2	6

## COIN FUND.

Purchase of a Gold Coin of Mahamud Shah,	50	0	0			
Ditto of a Gold Drodutus,	50	0	0			
Ditto of a Gold Husan Shah,	26	0	0			
Ditto of a Large Coin Cabinet,	139	0	0			
Paid Fee for getting Money Order,	0	8	0			
Ditto Velvet Bag for Coin,	0	8	0			
				266	0	0

## DR. STOLICZKA MEMORIAL FUND.

Paid Sheppard Photographer,	37	0	0			
Ditto Discount to the Bank of Bengal for Cashing A. V. Nursing Rao's Draft,	1	0	0			
Ditto for 4 yards Long Cloth for covering Picture,	0	12	0			
Ditto Postage on a returned letter of Capt. A. G. Ross,	0	0	6			
				38	12	6

## MISCELLANEOUS.

O. P. Fund,	360	11	1			
Yusuf Ali Moonshee,	370	5	0			
Money Lala Bysack,	154	6	6			
Scientific Lecture,	156	14	6			
J. Beames, Esq.,	0	12	0			
W. Theobald, Esq.,	3	4	0			
W. Irvine, Esq.,	5	15	0			
Capt. W. G. Hughes,	1	8	0			
J. Sime, Esq.,	0	7	9			
				1,054	3	10

Carried over, Rs. 16,163 7 0



## RECEIPTS.

	Brought over, Rs.	20,584 9 0
BALANCE OF 1873.		
In the Bank of Bengal, . . . . .	3,392 14 6	
Cash in hand, . . . . .	393 15 10	
	<hr/>	3,786 14 4

Rs. 24,371 7 4

Examined and found correct,

E. GAY,

F. W. PETERSON,

*Auditors.*

13th Feb., 1875.

## DISBURSEMENTS.

1874.

1873.

		Brought over, Rs.		1,054 3 10		16,163 7 0	
Major J. W. H. Johnstone,	.	.	.	12	8	0	
A. W. Chennel, Esq.,	.	.	.	3	6	0	
Col. D. Brown, .	.	.	.	0	6	9	
Dr. C. J. Ibbetson,	.	.	.	7	6	0	
Government N. W. Provinces,	.	.	.	15	3	0	
Major G. E. Fryer,	.	.	.	1	6	0	
Jossim Duftory,	.	.	.	40	0	0	
Dr. F. Stoliczka,	.	.	.	7	5	6	
J. Wood-Mason, Esq.,	.	.	.	2	0	0	
Rev. A. P. Hoernle,	.	.	.	1	7	0	
J. G. Delmerick, Esq.,	.	.	.	2	0	0	
F. S. Growse, Esq.,	.	.	.	2	9	0	
J. G. Forbes, Esq.,	.	.	.	0	3	0	
E. W. Oates, Esq.,	.	.	.	1	4	0	
Dr. D. Waldie, .	.	.	.	3	6	0	
E. T. Atkinson, Esq.,	.	.	.	0	8	0	
M. Macaullef, Esq.,	.	.	.	4	6	0	
T. W. H. Tolbert, Esq.,	.	.	.	3	5	0	
Lieut.-Col. F. W. Stubb,	.	.	.	8	5	3	
H. C. Williams, Esq.	.	.	.	0	4	0	
Dr. J. M. Foster,	.	.	.	2	10	0	
Lieut.-Col. W. E. Marshall,	.	.	.	4	1	0	
E. W. Westmacott, Esq. .	.	.	.	2	2	0	
W. W. Hunter, Esq.,	.	.	.	0	4	0	
Thakura Giriprasad Singh,	.	.	.	0	4	0	
Raja Joykissen Dass Bahadur,	.	.	.	0	4	0	
V. A. Smyth, Esq.,	.	.	.	0	1	0	
Lieut. W. A. Holcombe, .	.	.	.	2	4	0	
D. K. Pomeroy, Esq.,	.	.	.	3	9	0	
Archbald Constable, Esq.,	.	.	.	2	5	0	
Lieut.-Col. T. C. Hamilton,	.	.	.	0	8	9	
				<hr/>		1,189 11 1	1,966 13 1
						17,353 2 1	

## BALANCE.

In the Bank of Bengal, viz.

Account of Stoliczka Memorial Fund,

. 1,201 3 6

Account of Asiatic Society of Bengal,

. 5,655 8 8

Cash in hand,

. 6,856 12 2  
161 9 1

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7,018 5 3

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Rs. 24,371 7 4

Examined and found correct,

E. GAY,

F. W. PETERSON,

*Auditors.*

13th. Feb., 1875.

# STATEMENT

## *Abstract of the Cash Account*

RECEIPTS.		1874.	1873.
ORIENTAL PUBLICATIONS.			
Received by Sale of Bibliotheca Indica, Rs.	2,069 7 9		
Ditto by Subscription to ditto, .	144 12 0		
Ditto Refund of Postage, .	53 4 9		
Ditto Refund of Freight, .	3 9 0		
	<hr/>	2,271 1 6	2,970 3 9
GOVERNMENT ALLOWANCE.			
Received from the General Treasury at 500 Rs. per month, .	6,000 0 0		
Ditto ditto additional grant for the publication of Sanskrit Works, at 250 per month, .	3,000 0 0		
	<hr/>	9,000 0 0	9,000 0 0
TABAQATI NISIRI.			
Refund of the half amount from Yusuf Ali Munshee on account of Landing charges, .	3 3 0		
	<hr/>	3 3 0	
Asiatic Society of Bengal, .	360 11 1		
Archbold Constable, .	1 0 0		
Babu Braj Bhushan Das, .	7 1 3		
Babu Profullo Chunder Banerjee, .	1 9 0		
Babu Kedar Nath Banerjee, .	20 11 0		
Babu Buddinath Chowdhury, .	3 0 0		
Babu Gopal Row Hurry, .	0 8 0		
	<hr/>	394 8 4	975 6 10
CONSERVATION OF SANSKRIT MSS.			
Received from the Government of Bengal, in part of the amount sanctioned towards the Conservation of Sanskrit MSS. being 1st half of 1873-74, .	1,550 0 0		
Ditto ditto being 2nd half of 1873-74, .	1,550 0 0		
Ditto ditto being 1st half of 1874-75, .	1,600 0 0		
Sale proceeds of 11 Copies Notices of Sanskrit MSS., .	11 0 0		
	<hr/>	4,711 0 0	2,002 0 0

Carried over, Rs. 4,679 12 10



## No. 2.

*Oriental Publication Fund, 1874.*

DISBURSEMENTS.			1874.	1873.
ORIENTAL PUBLICATIONS.				
Paid Commission on Sale of Books, &c., Rs.	180 12 0			
Ditto Packing charges, . . . . .	27 2 0			
Ditto Postage Stamps, . . . . .	117 14 10			
Ditto Freight, . . . . .	136 15 0			
Ditto Advertising charges, . . . . .	200 0 0			
Ditto Insufficient Postage, . . . . .	0 1 0			
Ditto Copying charges, . . . . .	2 6 0			
Ditto Custom duty and landing charges, . . . . .	10 0 0			
Ditto Banghee expenses, . . . . .	0 4 0			
Ditto Printing charges, . . . . .	8 0 0			
Ditto Petty charges, . . . . .	3 12 3			
			687 3 1	1,132 10 9
LIBRARY.				
Paid Purchase of Persian Printed Books, . . . . .	494 11 0			
			494 11 0	777 6 0
CUSTODY OF ORIENTAL WORKS.				
Paid Salary of the Librarian, . . . . .	360 0 0			
Ditto Establishment, . . . . .	724 0 0			
Ditto Stationery, . . . . .	30 0 0			
Ditto Fee for Stamping Cheques, . . . . .	2 13 0			
Ditto Book Binding, . . . . .	99 0 0			
Ditto Bearing Postage, . . . . .	0 2 0			
Ditto Repairing Almirah, Table, &c., . . . . .	6 8 0			
Ditto Purchase of Ledger, . . . . .	3 0 0			
Ditto Printing charges, . . . . .	8 7 0			
Ditto Banghee expenses, . . . . .	4 11 6			
Ditto Packing charges, . . . . .	3 14 3			
Ditto 6 bottles of Carbolic Acid, . . . . .	12 0 0			
Ditto Petty charges, . . . . .	18 14 0			
			1,273 5 9	1,220 9 9
CATALOGUE OF SANSKRIT MSS.				
Paid Salary for Cataloguing Sanskrit MSS., . . . . .	358 0 0			
			358 0 0	360 0 0
COPYING CHARGES.				
Paid Copying MSS., . . . . .	19 4 0			
			19 4 0	20 4 0
AIN I AKBARI.				
Paid Printing charges, . . . . .	949 8 0			
Ditto Binding of Ain i Akbari, . . . . .	59 12 0			
Ditto Banghee expenses, . . . . .	2 8 0			
			1,011 12 0	699 0 0
SAMA VEDA.				
Paid Editing and Printing charges, . . . . .	608 7 0			
			608 7 0	1,205 6 6
AGNIPURANA.				
Paid Editing and Printing charges, . . . . .	973 8 6			
Ditto Banghee expenses, . . . . .	3 2 0			
			976 10 6	
CHATURVARGA CHINTAMANI.				
Paid Editing and Printing charges, . . . . .	344 11 0			
			344 11 0	1,312 12 0
Carried over, Rs.			5,774 0 4	

RECEIPTS.

1874.

1873.

Brought over, Rs. 16,379 12 10 .

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Carried over, Rs. 16,379 12 10

## DISBURSEMENTS.

1874.

1873.

Brought over, Rs. 5,774 0 4

## MIMANSA DARŚANA.

Paid Editing and Printing charges,	. 147 6 0	147 6 0	
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## LĀTYANA SŪTRA.

Paid Printing charges,	. 56 5 9	56 5 9	
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## KHAṬI KHAN.

Paid Printing charges,	. 539 0 0		
Ditto Copying charges,	. 62 10 0		
Ditto for making Index,	. 220 0 0	821 10 0	

## PRITHIRAJ RASU.

Paid Editing and Printing charges,	. 376 0 0		
Ditto Fee for getting money order,	. 1 8 0		
Ditto Freight,	. 2 9 6		
Ditto Bunghee expenses,	. 1 6 0	381 7 6	236 0 0

## ISABAH OR BIOGRAPHICAL DICTIONARY.

Paid Printing charges,	. 81 0 0	81 0 0	
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## FARIHANGI RASHIDI.

Paid Editing and Printing charges,	. 779 0 0	779 0 0	1,182 8 0
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## SRAUTA SŪTRA ASWALAYANA.

Paid Editing and Printing charges,	. 250 10 0	250 10 0	435 0 0
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## KĀTANTARA.

Paid Editing and Printing charges,	. 1,440 9 0	1,440 9 0	
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## TANDYA MAHA BRAHMANA.

Paid Editing and Printing charges,	. 428 10 9	428 10 9	
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TĀITTIṚIYA SAHITA OF THE BLACK  
YAJURVEDA.

Paid Editing and Printing charges,	. 326 6 0	326 6 0	342 0 0
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## ĀTHEAVANA UPANISHAD.

Paid Editing and Printing charges,	. 304 15 6	304 15 6	988 15 0
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## SAHITYA DARPAṆA.

Paid Postage,	. 1 4 0	1 4 0	0 6 0
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## ĀLAMGIRI NĀMAK.

Paid Printing charges,	. 241 2 0	241 2 0	
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## MĀASIR ĀLAMGIRI.

Paid Printing charges,	. 371 1 2 0	371 1 0	25 0 0
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## HAṬI ASMAN.

Paid Printing charges,	. 128 4 0	128 4 0	
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## PIṆGALA CĪHĀNDA SŪTRA.

Paid Editing charges,	. 1 49 0 0	1 49 0 0	
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Carried over, Rs. 1,683 6 10



RECEIPTS, 1874. 1873.

Brought over, Rs. 16,379 12 10

BALANCE OF 1873.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS.

Dr. J. Muir, . . . 3,733 12 11

O. P. Fund, . . . 898 10 0

. . . 1,267 15 5

5,923 12 2

Rs. 22,303 9 0

Examined and found correct,

E. GAY,

F. W. PETERSON,

*Auditors.*

13th Feb., 1875.

## DISBURSEMENTS.

1874.

1873.

Brought over, Rs. 11,683 6 10

## GOBHILIYA GRIHYA SUTRA.

Paid Printing charges, . . . . .	224 0 0	224 0 0	562 12 0
Asiatic Society of Bengal, . . . . .	641 1 5		
G. V. China Tumby, Esq. . . . .	0 0 10		
Gopal Row Hurry, . . . . .	0 0 10		
A. Cadell, Esq. . . . .	3 14 0		
Babu Braj Bhushan Das, . . . . .	9 12 3		
Babu Tarine Churn Bhadoori, . . . . .	2 10 0		
Thakura Giriprasad Sing, . . . . .	3 12 0		
Babu Giridhone Lal, . . . . .	4 14 0		
		666 1 4	

## CONSERVATION OF SANSKRIT MSS.

Paid Salary for preparing Catalogue of Sanskrit MSS., . . . . .	360 0 0		
Ditto ditto for translating the Sanskrit Catalogue, . . . . .	240 0 0		
Ditto Salary for Travelling Pandita, . . . . .	345 1 6		
Ditto Copying MSS., . . . . .	187 2 6		
Ditto for Stationery, . . . . .	50 10 0		
Ditto for Banghee expenses, . . . . .	5 4 0		
Ditto Printing charges of Notices of Sanskrit MSS., . . . . .	912 0 0		
Ditto Packing charges, . . . . .	22 2 0		
Ditto Contingent charges for Travelling Pandita, . . . . .	9 7 6		
Ditto Postage for sending Notices of Sanskrit MSS., . . . . .	12 6 0		
Ditto Freight for ditto ditto, . . . . .	46 0 0		
Ditto Custom Duty and Landing charges, . . . . .	16 0 0		
Ditto Babu Rajendra Lala Mitra, as an advance for travelling allowance and for purchase of Sanskrit MSS., . . . . .	1,200 0 0		
Ditto Printing Paper, . . . . .	22 0 0		
Ditto for purchase of Sanskrit MSS., . . . . .	35 0 0		
Ditto for preparing Stones for Sanskrit Notices Form and Printing 510 Copies for ditto, . . . . .	104 0 0		
Ditto for Khara Cloth and Tape for binding Sanskrit MSS., . . . . .	19 5 6		
Ditto Petty charges, . . . . .	25 13 3		
		3,612 4 3	2,244 11 6

## BALANCE.

In the Bank of Bengal, viz. :			
Conservation of Sanskrit MSS., . . . . .	4,832 8 8		
Dr. J. Muir, . . . . .	898 10 0		
Q. P. Fund, . . . . .	261 6 0		
	5,992 8 8		
Cash in hand, . . . . .	125 3 11		
		6,117 12 7	
		Rs. 22,303 9 0	

Examined and found correct,

E. GAY,

F. W. PETERSON,

*Auditors.*

13th Feb., 1875.

## STATEMENT NO. 3.

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st July, 1875.*

ASSETS.		1874.	1873.	LIABILITIES.		1874.	1873.
CASH.				Salary and Establishment for Decem-			
In the Bank of Bengal, .....	6,856	12 2	3,392 14 6	ber, 1874, .....			324 10 8
Cash in hand, .....	161	9 1	393 15 10	PUBLICATION.			
Government Securities, .....	9,200	0 0	7,700 0 0	Proceedings No. IX. of			
				1874, .....	250	4 0	
				Journal, Part I. No. III. ...	545	0 0	
				Ditto Part II. No. III. ...	232	8 0	
				Tinted Plate Paper, .....	10	6 6	
				Probable Cost of Proceed-			
				ing No. X. ....	300	0 0	
				Do. Journal, Part I. No. 4, 500	0 0		
				Do. " Part II. No. 4, 400	0 0	2,238 2 6	
				Dr. Stoliczka Memorial Fund, .....	1,201	3 6	
				Collector of Assessment, House rate for			
				October, Nov. and Dec., 1874, ....	96	0 0	
				Police and Lighting rate, .....	54	0 0	
				The Great Eastern Hotel, for Tea and			
				Coffee, .....	8	4 0	
				F. and C. Osler, & Co. for 2 Osler's			
				patent Double Light-plated Reading			
				Lamp, .....	112	0 0	
				Total Rs. ....	4,034	4 8	
				Total Rs. ....	25,418	3 9	

We have examined this Statement, and see no reason to doubt its correctness.

E. GAY.

F. W. PETERSON.

STATEMENT No. 4.  
*Shewing the Assets and Liabilities of the Asiatic Society of Bengal, O. P. F.,  
on the 1st January, 1875.*

ASSETS.		1874.	1873.	LIABILITIES.		1874.
In the Bank of Bengal, viz.,	.....			Salary and Establishment for Dec., 1874,	90	5
Conservation of Sanskrit MSS.,	4,832 8 8			Baptist Mission Press, Printing Charges,		
Dr. J. Muir, .....	898 10 0			Alamgiri Namah Fas. VI.	371	12
O. P. Fund, .....	291 6 0	5,992 8 8	5,900 6 4	Haft Asman, No. 294, ..	444	15
					816	11
Cash in hands, .....	125 3 11	23 5 10		Deduct paid on the 17th		
Government Allowance for Dec., 1874, ..	750 0 0	750 0 0		September, 1874, ....	500	0
Bibliotheca Sale and Subscription, ....	2,067 11 2	1,820 14 0				
Col. Dalton, Ethnology of Bengal, ....	42 13 8	42 13 8		Ganessa Press, Printing Charges,		
				Pingala Chhanda Sutra Fas. III., ....	125	12
				Hindoo Patriot Press, for advertising, ..	200	0
				Conservation of Sanskrit MSS., .....	4,832	8
				Dr. J. Muir, .....	898	10
				Asiatic Society of Bengal, .....	360	11
					6,824	10
		8,978 5 5	8,537 7 10	Professor Escheling on account of editing		
				Kāiantra, .....	Rs.	288

We have examined this Statement, and see no reason to doubt its correctness.

E. GAY,  
F. W. PETERSON.

## STATEMENT No. B.

*Conservation of Sanskrit MSS. in Account Current with the Asiatic Society of Bengal.*

Cr.	1874 0 0	Dr.	1874 0 0
Balance of 1873, .....	3,783 12 11	Amount Spent in 1874, .....	3,612 4 3
Received from the Government of Bengal for Conservation and Publication of Sanskrit MSS. up to First Half of 1874, i. e. June, 1874, .....	4,700 0 0	Balance, .....	4,832 8 8
Sale proceeds of 11 Copies Notices of Sanskrit MSS., .....	11 0 0		
	<u>8,444 12 11</u>		<u>8,444 12 11</u>
	Rs. ....		Rs. ....
	8,444 12 11		8,444 12 11

Examined and found correct.

E. GAY,  
F. W. PETERSON,  
*Auditors.*

The 13th February, 1875.

[APPENDIX.]

LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
ON THE 31ST DECEMBER, 1874.

## LIST OF ORDINARY MEMBERS.

The \* distinguishes Non-Subscribing, the † Non-Resident Members,  
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with rule 14 B. of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.		
1860 Dec.	5.	Abdullatíf Khán Bahádúr, The Hon., Maulavi.
1868 Sept.	2.	†Adam, R. M., Esq.
1860 July	4.	†Ahmad Khan, Sayyid, Bahádúr, C. S. I.
1872 April	3.	†Ahsanullah, Khwajah.
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.
1866 Jan.	17.	*Allan, Lieut.-Col. A. S.
1871 June	7.	†Alexander, J. W., Esq.
1860 Oct.	3.	Amir Ali Khán Bahádúr, Munshí.
1874 June	3.	Amir Ali, Sayyid, Esq.
1865 Jan.	11.	*Anderson, Dr. J., F. L. S.
1872 June	5.	†Anderson, A., Esq.
1871 Sept.	6.	†Atkinson, E. T., Esq., C. S.
1855 July	4.	Atkinson, W. S., Esq., M. A., F. L. S.
1869 Feb.	3.	†Attar Singh Bahádúr, Sirdár.
1870 Feb.	2.	*Baden-Powell, H., Esq., C. S.
1873 Aug.	6.	†Badgley, Capt. W. F.
1859 Aug.	3.	Balaichánd Sinha, Bábu.
1865 Nov.	7.	†Ball, V., Esq., Geol. Survey.
1860 Nov.	1.	Banerjea, Rev. K. M.
1869 Dec.	1.	†Barker, R. A., Esq., M. D.
1873 March	5.	Barclay, G. W. W., Esq., M. A.
1873 Jan.	8.	Bate, Rev. J. D.
1860 July	4.	Batten, G. H. M., Esq., C. S.
1859 May	4.	Bayley, E. C., The Hon'ble, B.C.S., C.S.I.
1861 Feb.	6.	†Bayley, S. C., Esq., B. C. S.
1873 Feb.	5.	Bayne, R. R., Esq., B. A.
1864 Sept.	7.	†Beames, J., Esq., B. C. S.
		Calcutta
		Agra
		Benares
		Dacca
		Mari, Panjáb
		Europe
		Benares
		Calcutta
		Calcutta
		Yunan Mission
		Fattehghur
		Nynsee Tal
		Calcutta
		Bhadour, Ludiana
		Europe
		Shillong
		Calcutta
		Geol. S. Office
		Calcutta
		Birbhum
		Calcutta
		Allahabad
		Calcutta
		Patna
		Calcutta
		Catak



Date of Election.		
1841 April 7.	Beaufort, F. L., The Hon., B. C. S.	Calcutta
1867 July 3.	Belletty, N. A., Esq.	Calcutta
1869 Jan. 20.	Bellew, Dr. P. F.	Bombay Mint
1871 March 1.	Benedict, E., Esq., C. E., M. Inst. C. E.	Calcutta
1862 Oct. 8.	†Bernard, C. E., The Hon., B. C. S.	Nagpur
1872 Aug. 7.	Beverly, H., Esq., C. S.	Calcutta
1864 Nov. 2.	Bhudeva Mukerjea, Bábu.	Berhampur
1874 Nov. 4.	Bhagabati Charn Mallik, Bábu.	Calcutta
1872 Nov. 6.	Bisset, Lieut. W. S. S., R. E.	Calcutta
1873 Dec. 3.	Blackburn, J., Esq.	Calcutta
1857 Mar. 4.	*Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta
1859 Aug. 3.	*Blanford, W. T., A. R. S. M., F. R. S., F. G. S.	Europe
1873 Aug. 6.	†Bligh, W. G., Esq.	Muttra
1873 April 2.	†Blisset, T. T., Esq.	Dacca
1864 April 6.	Blochmann, H., Esq., M. A.	Calcutta
1871 April 5.	†Bourne, T. W., Esq., M. A., M. E. C. E.	Central Provinces
1871 April 5.	†Bourne, Walter, Esq., C. E.	Madapur
1868 Jan. 15.	†Boxwell, J., Esq., C. S.	Dumka
1872 June 5.	†Brooks, W. E., Esq., C. E.	Maghal Sarai
1860 March 7.	†Brandis, Dr. D.	Calcutta
1871 Jan. 4.	Brough, R. S., Esq.	Calcutta
1874 March 4.	†Brown, R. Esq., M. D.	Manipur
1866 Nov. 7.	†Browne, Lieut.-Col. Horace A.	Thayetmyo
1874 April 1.	Bruce, W. D. Esq., C. E.	Calcutta
1871 July 5.	Buckland, C. T., Esq., C. S.	Hughli
1871 Sept. 6.	†Buckle, H., Esq.	N. Arracan
1872 Jan. 3.	*Butcher, W. D., Esq., M. R. C. S.	Europe
1873 Aug. 6.	*Butler, Capt., J.	Samaguting
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Banda
1863 June 3.	*Campbell, The Hon'ble Sir G., K. C. S. I.	Europe
1873 March 5.	Cappel, A., Esq.,	Calcutta
1860 Jan. 3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Ghazipur
1868 Aug. 5.	†Chandramohan Goswami, Pandit.	Gowhattay
1863 Aug. 5.	†Chandranáth Ráy, Rája.	Nator
1872 Dec. 4.	†Chard, Rev. C. H.	Thayetmyo
1874 Aug. 5.	†Chennell, A. W. Esq.	Shillong
1871 Sept. 6.	†Chisholm, R. F., Esq.	Madras
1868 Feb. 5.	†Clark, Lieut. Col. E. G. Bengal Staff Corps.	Kheree, Oudh
1871 March 1.	Clarke, C. B., Esq.	Calcutta
1872 Aug. 7.	†Clutterbuck, Capt. F. St. Quintin.	Peshawar
1874 Nov. 4.	†Constable A. Esq.	Lucknow
1871 Oct. 4.	*Cooke, H. G., Esq., C. S.	Europe
1868 Dec. 2.	†Cooke, J. E., Esq.	Madras
1872 June 5.	*Court, Major M. H.	Europe
1874 March 4.	Crombie A. Esq., M. D.	Calcutta
1873 Aug. 6.	Cunningham, D. D., Esq., M. B.	Calcutta
1874 July. 1.	Cowan, Capt. S. H.	Calcutta

Date of Election.			
1847 June.	2.	†Dalton, Col. E. T., C. S. I., Staff Corps.	Chhota Nagpur
1870 May	4.	†Damant, G. H., Esq., C. S.	Cachar
1878 Dec.	3.	†Dames, M. L., Esq., C. S.	Kurnal, Panjab
1871 Jan.	4.	*Daukes, F. C., Esq., C. S.	Europe
1861 Nov.	6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.	Lahore
1869 April	7.	*Day, Dr. F., F. L. S., F. Z. S.	Europe
1856 June	4.	†DeBourbel, Major R., Royal Engrs.	Lucknow
1874 July	1.	Deane, Capt. T.	Calcutta
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., I. M. Service.	Deoli
1872 Aug.	7.	Dejoux, P., Esq.	Calcutta
1869 Oct.	6.	†Delmerick, J. G., Esq.	Delhi
1873 Jan.	8.	†Dennys, H. L., Esq.	Nagpur
1864 July	6.	Devendra Mallik, Bábu.	Calcutta
1862 May	7.	†Dhanapati Singh Dughar, Ráy, Bahádur.	Azimganj
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.	Calcutta
1870 May	4.	*Dobson, G. E., Esq., B. A., M. B., F. L. S.	Europe
1859 Sept.	7.	†Douglas, Col. C.	Lucknow
1869 Feb.	3.	*Drew, F., Esq.	Europe
1874 July	1.	Drummond, Col. H., R. E.	Calcutta
1870 March	8.	†Duke of Edinburgh, His Royal Highness.	Europe
1873 July	2.	†Durand, H. M., Esq., C. S.	Bhágulpur
1867 June	5.	†Duthoit, W., Esq., C. S. Dvijendranath Thakur, Babu.	Mirzapur Calcutta
1871 March	1.		
1863 May	6.	†Edgar, J. W., Esq., B. C. S.	Darjeling
1874 Dec.	2.	†Egerton, R. E., Esq., C. S.	Lahore
1871 Dec.	2.	†Elliot, J., Esq., M. A.	Allahabad
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.	Europe
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.	Allahabad
1871 Oct.	4.	†Evezard, Col. G. E.	Poona
1863 Oct.	7.	Ewart, J., Esq., M. D.	Calcutta
1859 Dec.	7.	Fath Ali, Maulavi.	Calcutta
1851 May	7.	*Fayrer, Dr. J., C. S. I.	Europe
1863 Jan.	15.	*Fedden, Francis, Esq., Geol. Survey.	Europe
1868 May	6.	†Field, C. D., Esq., M. A., C. S.	Berhampur
1869 Sept.	1.	*Fisher, J. H., Esq., C. S.	Europe
1872 Dec.	4.	*Forbes, Major, J. G., R. E.	Europe
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.	Dehra
1869 Oct.	12.	*Forlong, Lieut.-Col. J. G. R., M. S. C.	Europe
1863 June	3.	†Forsyth, the Hon. Sir T. D., C. B., K. C. S. I.	Calcutta
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.	Nazira, Assam
1873 July	2.	†Fraser, Capt. E.	Persian Gulf
1869 Sept.	1.	Fryer, Major G. E., Dy. Commissioner.	Sandoway, Arra- kan

Date of Election.			
1867 Sept.	4.	Fyfe, The Rev. W. C.	Calcutta
1878 Dec.	3.	†Gamble, J. S., Esq.	Pankabari, Dar- jiling.
1871 June	7.	Gangaprasad Sinha, Babu.	Calcutta
1871 Aug.	2.	†Gangaprasad, Munshi.	Moradabad
1874 July	1.	†Gardner, D. M., Esq.	Azimghar
1859 Aug.	3.	Gastrell, Col. J. E., Supdt. Rev. Sur- vey.	Calcutta
1862 Feb.	5.	†Gauradās Baisāk, Bābu.	Birbhum
1867 Sept.	4.	†Gauvain, Capt. V.	
1867 Dec.	4.	Gay, E., Esq., M. A.	Calcutta
1859 Sept.	7.	Geoghegan, J., Esq., B. C. S.	Calcutta
1869 Feb.	3.	†Giriprasād Sing, Thākur.	Allighar
1861 Feb.	6.	†Godwin-Austen, Major H. H., Topogra- phical Survey.	Daphla Expedi- tion
1869 Oct.	6.	†Gomes, A. D. B., Esq.	Sunderbans
1872 Nov.	6.	*Gordon, C. B. P., Esq.	Europe
1862 July	2.	†Gordon, Robert, Esq., C. E.	Henzaday
1869 July	7.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1871 March	1.	Govindacumar, Chaudhuri.	Calcutta
1863 Nov.	4.	*Gowan, Lieut.-Col. J. Y.	Europe
1866 June	6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1873 Aug.	6.	Girischandra Sinha, Kumara.	Calcutta
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.	Mathurā
1871 Jan.	4.	Gunendranath Thakur, Babu.	Calcutta
1864 Dec.	5.	†Gurucharan Dās, Bābu.	Krishnagar
1871 June	7.	Habiburrahman, Maulavi.	Calcutta
1867 July	3.	†Hacket, C. A., Esq., Geol. Survey.	Geol. S. Office
1869 April	3.	*Hæberlin, The Rev. C.	Europe
1866 Jan.	17.	†Hamilton, Lieut.-Col. T. C.	Rangoon
1855 March	7.	†Hamilton, R., Esq.	Wardah
1871 July	3.	Hamilton, Col. O.	Calcutta
1861 March	1.	†Harachandra Chaudhuri, Babu.	Sherepur
1866 Nov.	1.	Harendra Krishna Bahādur, Raja.	Calcutta
1871 Feb.	1.	†Harkness, T. F., Esq., C. S.	Etah
1861 Feb.	2.	†Harrison, A. S., Esq., B. A.	Allahabad
1859 Oct.	6.	*Haughton, Col. J. C., C. S. I.	Europe
1874 March	4.	Haworth, J. H., Esq.	Calcutta
1873 May	7.	Hector, Rev. John, M. A.	Calcutta
1862 Aug.	6.	Heeley, W. L., Esq., B. A., C. S.	Calcutta
1872 May	1.	Heilgers, W., Esq.	Calcutta
1874 Jan.	7.	Heintze, C., Esq.	Calcutta
1868 Aug.	5.	†Hobart, R. T., Esq., C. S.	Etah

Date of Election.			
1872 Nov.	6.	†Holcombe, Lieut. W. A.	Assam
1872 Dec.	4.	*Hoernle, Rev. A. F. R., Ph. D.	Europe
1868 Nov.	4.	*Holroyd, Capt. W. R. M.	Lahore
1873 Jan.	8.	†Houstoun, G. L., Esq.	Johnstone Castle, Renfrewshire.
1863 Jan.	15.	†Howell, M. S., Esq., C. S.	Benares
1871 April	5.	Howell, A. P., Esq., C. S.	Calcutta
1866 Feb.	7.	Hoyle, G. W., Esq.	Calcutta
1867 Aug.	7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S. Geol. Survey of India.	Geol. S. Office
1873 March	5.	*Hughes, A. J., Esq., C. E.	Europe
1866 Jan.	17.	*Hughes, Captain W. G., M. S. C.	Europe
1870 Jan.	5.	Hume, Allan O., Esq., C. B., C. S.	Calcutta
1870 June	1.	Hunter, W. W., Esq., LL.D., C. S.	Calcutta
1868 April	1.	Hyde, Col. H., R. E.	Calcutta
1872 Dec.	4.	†Ibbetson, D. C. J., Esq., C. S.	Karnál, Panjáb
1866 March	7.	†Irvine, W., Esq., C. S.	Saharanpur
1871 March	8.	Isaac, T. S., Esq., C. E.	Calcutta
1853 Dec.	7.	†Isvariprasád Singh, Bahádur, Raja.	Benares
1874 Feb.	4.	†Jackson, Dr. C. J.	Puri
1865 June	7.	†Jaykissen Dás Bahádur, Rájá, C. S. I.	Cawnpur
1873 Aug.	6.	Jogeshachandra Datta, Babu.	Calcutta
1866 Feb.	7.	†Johnson, W. H., Esq.	Patna
1862 March	5.	*Johnstone, Major J. W. H., Dy. Commis- sioner.	Europe
1867 Dec.	4.	*Johnstone, Capt. J.	Europe
1873 Dec.	3.	†Johor, H. H., Maharaja of, K. C. S. I., K. C. C. I.	New Johor, near Singapore
1873 April	2.	†Jones, F., Esq.	Midnapur
1869 April	7.	Kabiruddin Ahmad, Maulavi.	Calcutta
1871 May	3.	Kaliprasanna Ghosh, Babu.	Calcutta
1861 Dec.	4.	†Kempson, M., Esq., M. A.	Allahabad
1874 Dec.	2.	†Khuda Baksh Khan, Maulavi Sahib	Patna
1874 April	1.	†Kimber, J., Esq., C. E.	Midnapur
1867 Dec.	4.	King, G., Esq., M. B.	Calcutta
1867 March	6.	†King, Capt. H. W.	P. & O. Co.'s Office
1862 Jan.	15.	King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. Office
1874 Nov.	4.	Knight, R., Esq.	Calcutta
1867 March	6.	†Knox, G. E., Esq., C. S.	Kirwee (Banda)
1860 May	5.	Kurz, S., Esq.	Calcutta
1868 Feb.	5.	*Lees, L. H., Esq., M. D.	Europe
1859 Dec.	7.	†Leonard, H., Esq., M. A., C. E.	Europe

Date of Election.			
1870 July	6.	†Lethbridge, E., Esq., M. A.	Krishnagur
1869 June	2.	*Leupolt, J. C., Esq., C. S.	Europe
1873 Feb.	5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov.	2.	Locke, H. H., Esq.	Calcutta
1869 April	7.	†Lockwood, E. D., Esq., C. S.	Monghyr
1866 Jan.	17.	†Low, J., Esq., G. T. S.	Dehra Dhoon
1869 July	7.	Lyall, C. J., Esq., B. A., C. S.	Calcutta
1874 March	4.	Lyall, A. C., Esq., C. S.	Calcutta
1870 April	6.	†Lyman, B. Smith, Esq.	Japan
1866 June	6.	Macdonald, Lieut.-Col. J., Staff Corps.	Calcutta
1873 May	7.	†Mackay, W., Esq., C. E.	Port Blair
1873 Dec.	3.	McLeod, K., Esq., M. D.	Calcutta
1848 April	5.	†MacLagan, Major-General R., R. E., F. R. S. E., F. R. G. S.	Lahore
1867 July	3.	*Macnamara, Dr. C.	Europe
1868 Dec.	2.	†Macauliff, M., Esq.	Montgomery
1874 Jan.	7.	†Magrath, C. F., Esq., C. S.	Bogra
1870 May	4.	†Macnaghten, C., Esq.	Rajkote College, Kattywar
1874 July	1.	Mallock Major, H. A.	Calcutta
1867 April	3.	Mahendralál Sircár, Dr.	Calcutta
1867 April	3.	Mainwaring, Lieut.-Col. G. B.	Calcutta
1852 Nov.	3.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov.	6.	Man, E. H., Esq.	Port Blair
1869 July	7.	†Markham, A. M., Esq., C. S.	Allahabad
1874 Aug.	5.	Marsh, Capt. H. C.	Barrackpore
1873 July	2.	†Marshall, C. W., Esq.	Berhampur
1873 Aug.	6.	†Marshall, Lieut.-Col. W. E.	Simla
1860 March	7.	Medlicott, H. B., Esq., F. G. S., Geol. Survey of India.	Calcutta
1874 July	5.	†Michell, Capt. T. B.	Gowhatty
1871 Sept.	6.	†Miles, Capt. S. B.	Muskat
1870 July	6.	Miller, A. B., Esq.	Calcutta
1867 June	5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.	Calcutta
1874 May	6.	†Minchin, F. J. V., Esq.	Madras
1874 July	1.	Molesworth, W. G., Esq., C. E.	Calcutta
1867 March	6.	*Montgomerie, Major T. G., R. E.	Europe
1854 Dec.	6.	Morris, The Hon'ble, G. G., B. C. S.	Calcutta
1854 Oct.	11.	Muir, The Hon'ble Sir W., K. C. S. I., B. C. S.	Calcutta
1862 July	2.	†Napier of Magdala, H. E. Lord R., General G. C. S. I., G. C. B.	Simla
1869 May	5.	Nevill, G. Esq., C. M. Z. S.	Calcutta

Date of Election.			
1865 Feb.	1.	†Newal Kishwar, Munshi.	Lucknow
1871 Jan.	4.	*Newton, Isaac, Esq.	Europe
1872 May	1.	†Niranjan Mukerji, Babu.	Benares
1869 July	7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5.	†Oates, E. W., Esq., C. E.	Pegu
1874 Oct.	4.	O'Kinealy, E., Esq., C. S.	Calcutta
1851 June	4.	Oldham, T., Esq., LL. D., F. R. S.	Calcutta
1873 Aug.	6.	Olpherts, W. J., Esq.	Calcutta
1864 Mar.	2.	Palmer, Dr. W. J.	Calcutta
1873 Aug.	6.	Parker, J. C., Esq.	Calcutta
1862 May	7.	Partridge, S. B., Esq., M. D.	Calcutta
1871 Dec.	6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 Mar.	6.	Pearimohan Mukarji, M. A., Babu.	Uttarparah
1860 Feb.	1.	*Pearse, Lieut.-Col. G. G.	Europe
1868 Nov.	4.	*Pearson, C. E., Esq., M. A.	Europe
1873 Aug.	6.	Pedler, A., Esq.	Calcutta
1869 July	7.	†Pell, S., Esq.	Ranigunge
1864 Mar.	2.	Pellew, F. H., Esq.	Hughli
1865 Sept.	6.	†Peppé, J. H., Esq.	Ranchi
1874 Jan.	7.	†Peppe, G. T., Esq.	Pachamba
1868 May	6.	Peterson, F. W., Esq.	Calcutta
1835 July	1.	*Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov.	2.	Phear, The Hon'ble J. B.	Calcutta
1869 Feb.	3.	†Pickford, J., Esq., M. A.	Madras
1868 April	1.	†Pramathanáth Ráy, Raja.	Digapati
1872 Dec.	4.	Prananath Sarasvati Pandit.	Bhawánipur
1869 Feb.	3.	Pratápachandra Ghosha, B. A.	Calcutta
1871 June	7.	*Pratt, Capt. C. S., Staff Corps.	Europe
1856 Mar.	5.	Rájendralála Mitra, Bábú.	Calcutta
1871 June	7.	Rámakrishna Dás, Bábú.	Calcutta
1837 Feb.	1.	Ramánáth Tagor, the Hon. Raja, C. S. I.	Calcutta
1874 Dec.	2.	†Ram Das Sen, Babu.	Berhampur
1860 Mar.	7.	†Reid, H. S., Esq., C. S.	Allahabad
1871 July	5.	†Reid, J. R., Esq. C. S.	Azinghar
1872 April	3.	Richards, Dr. V.	Goalundo
1868 April	1.	Robb, G., Esq.	Calcutta
1863 April	1.	†Robertson, C., Esq., C. S.	Mirzapur
1874 May	6.	Robinson, Col. D. G., R. E.	Calcutta
1865 Feb.	1.	Robinson, S. H., Esq.	Calcutta
1869 July	7.	†Ross, Lieut. J. C., R. E.	Bulandshahar
1870 Jan.	5.	†Ross, Alexander G., Capt., Staff Corps.	Edwardesabad
1871 Dec.	6.	†Samuells, Capt. W. L.	Manbhum

Date of Election.			
1872 Feb.	7.	†Sashagiri Sastri, M. B. A.	Madras
1870 May	4.	†Satyánand Ghoshál, Rája.	Benares
1873 Jan.	8.	Schlegel, F., Esq.	Calcutta
1870 May	4.	Schlich, Dr. W.	Calcutta
1869 Feb.	3.	Schwendler, L., Esq.	Calcutta
1874 July	1.	†Scully, Dr. J.	Kashgar
1860 July	4.	†Shelverton, G., Esq.	Waltair, near Vi- zagapatam
1863 April	1.	†Showers, Lieut.-Col. C. L.	Amballa
1866 June	6.	†Sime, J., Esq., B. A.	Delhi
1872 Aug.	7.	*Skrefsrud, Rev. L. O.	Europe
1864 Sept.	7.	†Sladen, Major E. B.	Amherst
1865 July	5.	†Smith, D. Boyes, Esq., M. D.	Dacca
1874 June	3.	Smith, V. A. C., Esq., C. S.	Hamirpur
1864 Mar.	2.	*Spearman, Capt. H. R.	Europe
1872 July	3.	†Stephen, Carr, Esq.	Simla
1863 Sept.	2.	†Stewart, R. D., Esq.	Raniganj
1870 April	6.	Stewart, R., Esq.	Calcutta
1870 Sept.	7.	†St. John, R. T., Esq.	Bassein
1861 Sept.	4.	Stokes, Whitley, Esq.	Calcutta
1869 Feb.	3.	†Strachey, The Hon'ble Sir J., K. C. S. I.	Allahabad
1859 Mar.	2.	†Stubbs, Lieut.-Col. F. W., Royal Artillery.	Lucknow
1858 July	7.	†Sutherland, H. C., Esq., B. C. S.	Sylhet
1864 Aug.	11.	Swinhoe, W., Esq.,	Calcutta
1865 Sept.	6.	Tawney, C. H., Esq., M. A.	Calcutta
1865 April	5.	Taylor, R., Esq.	Calcutta
1874 Mar.	4.	Taylor, Commander A. D., late Indian Navy.	Calcutta
1860 May	2.	Temple, The Hon'ble Sir R., K. C. S. I., B. C. S.	Calcutta
1859 Mar.	2.	†Theobald, W., Esq., Geological Survey.	Saharanpur
1869 Oct.	6.	†Thomson, A., Esq.	Faizabad
1847 June	2.	†Thuillier, Col. H. L., R. A., C. S. I., F. R. S.	Calcutta
1865 July	5.	†Tolbort, T. W. H., Esq., C. S.	Jhang, Panjab
1871 April	5.	*Treffitz, Oscar, Esq.	Europe
1861 June	5.	†Tremlett, J. D., Esq., M. A., C. S.	Muzaffargarh
1872 July	3.	Trevor, W. S., Major R. E.	Calcutta
1873 April	2.	Turnbull, R., Esq.	Calcutta
1861 Sept.	4.	Tween, A., Esq., Geological Survey.	Calcutta
1863 May	6.	*Tyler, Dr. J.	Europe
1869 June	2.	Udaychánd Datt, Bábu.	Calcutta
1873 April	2.	Umesh Chunder Datt, Bábu.	Calcutta
1873 May	7.	†Urmstn, H. B., Lieut.	Benares

Date of Election.			
1860 May	2.	*Vanrenen, Major A. D., Bengal Staff Corps.	Europe
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.	Benares
1864 April	6.	†Vijayarāma Gujapati Rāj Munniā Sultān Bahādur, Mabārājah Mirza Vijayanagarām.	Benares
1870 June	1.	†Vrindāvanachandra Mandala, Bábu.	Balasar
1871 Feb.	1.	Waagen, Dr. W.	Calcutta
1869 Aug.	4.	Wáhid Alí, Prince Jahán Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1.	†Walker, Col. J. T., R. E., F. R. S.	Dehra Doon
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1865 May	3.	Waterhouse, Capt. J., B. S. C.	Calcutta
1874 July	1.	Watt, Dr. George.	Hughli
1869 Sept.	1.	†Westland, J., Esq., C. S.	Nagpur
1867 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.	Dinajpur
1862 Oct.	8.	*Wheeler, J. T., Esq.	Europe
1873 April	2.	†White, E., Esq., C. S.	Bijnour
1867 Aug.	7.	†Wilcox, F., Esq.	Purulia
1873 Jan.	8.	†Williams, H. C., Esq., C. S.	Wardha
1873 May	7.	†Williams, G. R. C., Esq., C. S.	Banda
1867 Jan.	16.	†Williamson, Capt. W. J.	Garo Hills
1867 Mar.	6.	Willson, W. G., Esq., B. A.	Calcutta
1871 Mar.	1.	*Willson, James, Esq., B. A.	Dacca
1870 Aug.	3.	*Wilson, R. H., Esq., C. S.	Europe
1866 Mar.	7.	*Wise, Dr. J. F. N.	Europe
1867 July	3.	†Wood, Dr. J. J.	Ranchi
1874 Mar.	4.	†Wood, C. A., Esq.	Rungbir, Darji- ling
1870 Jan.	5.	Wood-Mason, J., Indian Museum.	Calcutta
1873 Aug.	6.	†Woodthorpe, Lieut. R. G., R. E.	Shillong
1869 Sept.	1.	Yadulál Mallik, Bábu.	Calcutta
1868 June	3.	Yatindramohan Tagore, Rājah Bahádur.	Calcutta
1867 Mar.	6.	†Yogendranáth Mallik, Bábu.	Andul
1862		*Yule, Col. H., R. E.	Palermo



## HONORARY MEMBERS.

Date of Election.			
1825 Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.	Paris
1821 "	6.	Sir John Phillippart.	London
1826 July	1.	Count de Noe.	Paris
1831 "	7.	Prof. C. Lassen.	Bonn
1835 May	6.	Prof. Lea.	Philadelphia
1842 Feb.	4.	Dr. Ewald.	Göttingen
1842 "	4.	Right Hon'ble Sir Edward Ryan, Kt.	London
1843 Mar.	30.	Prof. Jules Mohl, Memb. de l'Institut.	Paris
1847 Sept.	1.	Col. W. Munro.	London
1847 Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848 Feb.	2.	Dr. J. D. Hooker.	Kew
1848 Mar.	8.	Prof. Henry.	Princeton U. S.
1853 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.	London
1858 July	6.	B. H. Hodgson.	Europe
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.	Europe
1860 Mar.	7.	Prof. Max Müller.	Oxford
1860 Nov.	7.	Mons. Stanislas Julien.	Paris
1860 "	7.	Dr. Robert Wight.	London
1860 "	7.	Edward Thomas, Esq.	London
1860 "	7.	Dr. Aloys Sprenger.	Bern
1860 "	7.	Dr. Albrecht Weber.	Berlin
1868 Feb.	5.	Genl. A. Cunningham, C. S. I.	India
1868 "	5.	Prof. Bápu Déva Sástri.	Benares
1868 "	5.	Dr. T. Thomson.	London
1868 "	2.	A Grote, Esq.	London
1871 "	7.	Charles Darwin, Esq.	London
1872 "	1.	Sir G. B. Airy.	London
1872 June	5.	Prof. T. H. Huxley.	London

## CORRESPONDING MEMBERS.

1844 Oct.	2.	Macgowan, Dr. J.	Europe
1856 June	4.	Krämer, Herr A. von.	Alexandria
1856 "	3.	Porter, Rev. J.	Damascus
1856 "	4.	Schlagintweit, Herr H. von.	Munich
1856 "	4.	Smith, Dr. E.	Beyrout
1859 "	4.	Tailor, J., Esq.	Bussorah
1856 "	4.	Wilson, Dr.	Bombay
1857 Mar.	4.	Neitner, J., Esq.	Ceylon
1858 Mar.	3.	Schlagintweit, Herr R. von.	Giesen
1859 Nov.	2.	Frederick, Dr. H.	Batavia
1859 May	4.	Bleeker, Dr. H.	Europe
1860 Feb.	1.	Baker, The Rev. H.	E. Malabar
1860 "	1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1860 April	4.	Haug, Dr. M.	Munich
1861 July	3.	Gösche, Dr. R.	
1862 Mar.	5.	Murray, A., Esq.	London
1863 July	4.	Barnes, R. H., Esq.	Ceylon
1866 May	7.	Schlagintweit, Prof. E. von.	Munich
1866 "	7.	Sherring, Rev. M. A.	Benares
1868 Feb.	5.	Foucaux, M. F. H.	Paris
1868 "	5.	Holmböe, Prof.	Christiania

## ASSOCIATE MEMBERS.

Date of Election.			
1838	„	7.	Karámat Alí, Sayyid.
1865	May	3.	Dall, Rev. C. H.
1874	Feb.	4.	Schaumburgh, J., Esq.
1874	April	1.	Lafont, Rev. F. E., S. J.
			Hooghly
			Calcutta
			Calcutta
			Calcutta

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA  
THREE YEARS AND UPWARDS.\*

*Rule 14, A.*—In the event of an ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commutable into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to pay his original subscription, subject to the operation of rule 10 B.

*Rule 14, B.*—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

L. H. Lees, Esq., M. D.,

Date of leaving India.

1871

## \*LOSS OF MEMBERS DURING 1874.

## BY RETIREMENT.

W. Eddowes, Esq., M. D.  
G. E. Ward, Esq., C. S.  
C. Brownfield, Esq.  
Col. F. H. Rundall, R. E.  
Capt. E. H. Steel.  
A. Rogers, Esq.  
C. Sanderson, Esq.  
Lieut. C. T. Bingham.  
Lieut. R. Wace, R. A.  
Col. D. Brown.  
E. Buck, Esq., C. S.  
Capt. E. Swetenham.  
F. R. Mallet, Esq.  
Babu Syamacharan Sarcar.

Erinpura  
Fattehghur  
Kamrup  
Calcutta  
Marri, Panjab  
Calcutta  
Calcutta  
Allahabad  
Bombay  
Moulmein  
Naini Tal.  
Mhow

Calcutta

## BY DEATH.

Dr. Bhau Daji.  
Dr. F. Stoliczka.  
Babu Pulinavihari Sen.  
A. Bond, Esq.  
Dr. H. B. Buckle.

Bombay  
Yarkand  
Berhampore  
Calcutta  
Europe

## ELECTION CANCELLED.

Lieut.-Col. G. A. Searle.

Calcutta

\* This name will be removed from the next list of members unless intimation is meanwhile received from the member of his desire to retain the privileges of an ordinary member under the operation of Rule 14 A.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JANUARY, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 6th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:—

1. From the Secretary, Government of India, Home Department, a photograph of a colossal granite image in the Tinevelly District.

2. From M. E. Aymonier, a copy of 'Dictionnaire Francaise-Cambodgien.'

3. From M. Stanislas Meunier, a copy of the work entitled "Cours de Géologie Comparée."

4. From the Government of Bombay, a copy of the Memorandum on the Buddhist Caves at Junnar, by J. Burgess, Esq., and Translations of three Inscriptions from Badami, Pattadakal and Aiholli, by J. F. Fleet, Esq., Bombay C. S.

5. From F. Beaufort, Esq., a specimen of Sponge grown in a tank in the Dollanda Asylum.

Mr. Wood-Mason remarked that the mass exhibited was a dried specimen of the common freshwater Sponge that abounded in the tanks of Calcutta and its vicinity.

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

John Sutherland Gunn, Esq., M. B., Surgeon, Bengal Army.

Capt. C. S. F. S. Forbes, Deputy Commissioner, Shwegyeen.

Richard Lydekker, Esq., Geological Survey of India.

The following are candidates for ballot at the next meeting—

James Armstrong, Esq., Surgeon Bengal Army, proposed by Mr. H. B. Medlicott, seconded by Mr. J. Wood-Mason.

R. S. Whiteway, Esq., Asst. Magistrate, Moradabad, proposed by Mr. F. S. Growse, seconded by Mr. H. Blochmann.

J. Smidt, Esq., German Consul, proposed by Mr. H. Blochmann, seconded by Mr. L. Schwendler.

W. J. Porter, Esq., Assistant Supdt. of Police, Semroo, Arakan, proposed by Capt. W. G. Hughes, seconded by Capt. J. Waterhouse.

The following gentlemen have intimated their desire to withdraw from the Society—

E. D. Lockwood, Esq., Monghyr.

R. T. St. John, Esq., Bassein.

Sir W. J. Herschel, Cooch-Behar.

Lieut. W. S. Bisset, R. E.

The election of the undermentioned gentlemen who have not paid their admission fees is cancelled—

Amir Hossain Khan Bahadur.

C. F. Bligh, Esq.

G. C. Farr, Esq.

J. W. Johnstone, Esq., M. D.

Babu Mohima Chundra Chuckervatty.

E. O'Brien, Esq.

B. O'Brien, Esq.

Babu Sutyadyal Banerjee.

„ Vepena Veharry Mukerjee.

The President announced the receipt of a communication from the Secretary to the Government of India, Foreign Department, requesting suggestions from the Council of the Society on any matters of general or scientific interest to which the attention of the officers employed on the Yunan Mission might be directed, and stated that the Council have had the following suggestions drawn up for submission to the Government.

#### SUGGESTIONS FOR THE YUNAN EXPEDITION.

##### *Archæology.*

It is believed that inscriptions may possibly be found throughout the country traversed. It is possible that near Momein there may be some in the Arabic character, but it is almost certain that many in the Chinese character will be met with everywhere within the Chinese territory, as it is a common Chinese custom to erect arches, pillars, &c., many of which are inscribed with either edicts or personal notices. Those that are modern will hardly be worth copying; but where the buildings are reputed to be

ancient, or where the characters in which they are inscribed are not the ordinary characters of the country, and especially where more than one set of characters appears to be employed (bilingual and even trilingual inscriptions are not unknown in various parts of China), impressions, hand copies, or photographs might be taken. Small inscribed objects of a similar nature of apparent antiquity might be purchased.

Of ancient buildings, or buildings of architectural value, photographs, plans, and sketches might be made, and such information as can be procured regarding them noted down. Ancient Chinese MSS. might be bought, if procurable, but much judgment would be required in their selection; as to this, Mr. Elias would probably be able to advise. They should be transmitted to Hongkong or England, as they would be of no use in India. It is just possible, however, that old MSS. of the Qorán or other Arabic works may be procurable from amongst the spoils of the Panthays. If so, these might be secured. Chinese numismatics have, it is believed, become a study of some interest in Europe, but no hints can be given as to the value of the coins to be sought for.

It is just possible also that in some of the more famous Buddhist places, old Sanskrit MSS. may exist. Of these it is probable the mission could not procure the originals, but copies might be obtained. It is not believed, however, that the mission will meet with such good fortune. Chinese works being avowedly translations from the Sanskrit, or bearing on the connexion of China and India, would be valuable, especially those of a Buddhistic character.

### **Ethnology.**

The various races or tribes, of whom any trustworthy observations can be made or obtained, should be carefully distinguished: their typical characteristics, whether physical or in the mode and general circumstances of life and social economy, dwellings, implements, dress, funeral ceremonies and customs, and so on, should be noted. Their own traditions concerning their origin, tribal names, migrations, should be sought; and all sound information that can be collected in regard to language and history will be most valuable. Facts which serve to differentiate between Aryan and non-Aryan peoples should be especially looked for; and any Hindu-Aryan ingredient, when it can be detected, and the extent to which it prevails, should be marked. Also all data which could afford a reasonable foundation for comparison or connexion between the Mongolian and Malayan people of Burmah and China, on the one side, and the Kols and the Dravidian races of the peninsula of India, on the other, should as far as possible be secured. If any traces of pre-historic people can be discovered, such as may exist in the shape of human or animal remains, stone or metal implements, weapons, &c., in caves and gravel de-

posits, all the available evidence bearing on this head should be got together. And it need hardly be added that, in all cases where it is possible, measurements should be made, and photographs taken of typical specimens of differing peoples and races, with the view to exhibiting and precisely recording their general appearance and costume, their distinctive facial characteristics and shape of head, both for males and females.

### Meteorology.

On the march, of course, little can be done in the way of instrumental observations. Wind and cloud observations, however, may be made at all times without the aid of instruments other than a compass. It is scarcely necessary to say that among the mountains, the winds are greatly affected by the direction of the valleys, so that the movement of the clouds is the best, and in many cases the only, criterion of that of the great air currents. Advantage then should be taken of any opportunity of observing the direction in which clouds, immediately overhead, drift. The estimated proportion of clear sky (0 to 10), the forms of the clouds, and the general character of weather should also be recorded. On open plateaux, a register of the direction and the estimated force of the wind according to Beaufort's scale is specially important.

When a halt is made at any place and thus an opportunity of making instrumental observations afforded, the chief points to which attention should be given are the following:—

1. The diurnal range of temperature in the shade from the maximum and minimum thermometers. Care will be required in selecting a proper place for the thermometers to guard them from being affected by direct radiation to or from the clear sky.

2. The minimum temperature of radiation at night should be observed whenever possible by a thermometer placed on forked sticks a few inches above the ground. In taking these observations, it is necessary, if the ground is not level, to place the instrument in a slight hollow, or on black woollen cloth in a shallow box, or it will be affected by the convection of the air, and show a temperature many degrees higher than one protected from this influence.

3. A few sets of hourly barometrical observations extending from midnight to midnight (or, when this is not possible, from sunrise to sunset) would be very valuable. It will be interesting to see whether the diurnal oscillation follows the same law as on the Indian plains, or that of the Himálayan hill-stations.

4. When hourly observations of the barometer are made, those of the *hygrometer* should be made also. Besides these, observations of the wet and dry bulb thermometers should be taken at other times as often as practicable.

5. Wind and cloud observations have already been referred to. Any opportunity which may occur of observing the local variations of the mountain and valley winds should be taken advantage of. The diurnal changes of the wind in the valleys and passes are of special interest. Any observations of the night winds which blow down the valleys, the time they set in, their duration, force, and temperature will be important. Also their upper and lower limits.

It might also be worth while, if possible, to make local enquiries regarding the seasons, the prevailing winds, and the rainfall.

Barometric readings will probably be taken on the march for the determination of heights. As connected with the subject of meteorology it may not be out of place to remark here that whether atmospheric pressures be inferred directly, for this purpose, from the readings of a barometer, or indirectly from the boiling temperature of water, the observations should be made with a view to determine relative heights, or differences of heights, and not absolute altitudes above sea level. The absolute height of a given place above sea-level can only be determined from means of barometric observations, with any approach to accuracy, when the mean pressure of the air in the particular latitude, and for the particular time of year at sea-level, is known and also the direction and magnitude of the atmospheric *gradient*. But differences of heights may be calculated from day to day, in serene weather, by comparing observations of the pressure of the atmosphere (whether determined by barometer, or boiling point, the former of course being the more accurate) made at the same hours on successive days. It is obvious that only observations made at the same hours can be compared, as the difference of pressure between the 10 o'clock maximum and the 4 o'clock minimum, supposing it to be the same as in the plains of India, might correspond to a difference in altitude of about 130 feet. However, observations made on the same day at no greater intervals than one hour, and the shorter the interval the better, might be usefully compared to show approximately the difference in level between the bottom and the top of a mountain pass. The probable error for a difference of time of one hour would not be greater than 20 feet in excess or defect according to the circumstances. Such observations could be very conveniently made with a good, large aneroid, which should be frequently compared with the mercurial barometer, as aneroids are very liable to get out of order.

### Geography.

The main objects of Geographical research are doubtless well understood by the members of this Expedition, who have had so much practical experience in traversing unknown countries, and especially Mr. Ney Elias, the account of whose travels through China and Mongolia to the Russian capital, in the *Journal of the Royal Geographical Society*, is so well known.

It is believed that both this gentleman and Dr. Anderson have made full preparations as to suitable instrumental equipment, and every arrangement, for obtaining the best information as to the physical character of the country to be traversed, and for laying down the route, and sketching as much of the subtending country as possible, with the view to improving our Geographical knowledge of Western China.

It is not practicable to lay down detailed instructions on every occasion of an exploring expedition starting, as to outfit, equipment, and the use of instruments, neither is it necessary to go into the elements of surveying, adjustment of instruments, and practical astronomy, as best adapted for such purposes. But the members of this expedition may advantageously be referred to, and supplied with, that valuable little pamphlet prepared and published by a Committee of the Council of the Royal Geographical Society in 1871 (price 1 shilling) entitled "*Hints to Travellers*," which contains all that any explorer can possibly require to study and work up, for the determination of "Time," "Azimuth," "Latitude" and "Longitude;" also on portable instruments, together with types of all the Computations, Formulæ, &c. with Tables for Barometrical Heights, observations on the proper selection of instruments, adjustments, meteorological instructions, hints on the projection of routes, tables for rough triangulation without the use of instruments or computations, measurements of the velocity of rivers, and various other useful, easy and expeditious methods of ascertaining all that may be necessary to know.

This little work, addressed to "persons intending to explore a wild 'country,' and who who want to know what astronomical and mapping 'instruments, and what observations for latitude and longitude ought to be made," will be found of the most eminent service, and it takes up but very small space to carry about. If other works can be taken as part of the outfit, on such expeditions, these may be mentioned.

Galton's "*Art of Travel*."

Jackson's "*What to Observe*."

"*Admiralty Manual of Scientific Enquiry*," revised edition.

"*Manual of Survey for India*," 3rd Edition, 1875.

Books in fact in the present day are so numerous and cheap, so practical and abridged for portability, that the list might be extended indefinitely. Enough however appears to have been quoted, for the real necessities of Indian Geographical explorations.

### Geology.

There is no information in hand regarding the geology of the region between that already described by Dr. Anderson in western Yunan, and the east centre of China. Some further information regarding the age and



extent of the volcanic region of Momein, or of its having any connection with older eruptive rocks would be of much interest.

In a brief notice of the Geology of China in the "*Zeitschrift der Deutschen Geologischen Gesellschaft*" for Sept. 1873, Herr von Richthofen dwells principally upon the Löss formation, but mentions that gneiss is found everywhere to underlie Silurian, Devonian, Carboniferous, and Triassic strata, thus implying the presence of these formations; he adds that he had found no younger rocks, hence concluding that since the Trias that ground had not been submerged. These observations would seem to be confined to the north of China and to the basin of the Hoang-ho, for in a previously published paper, in the *American Journal*, he mentions finding nummulitic limestone in force, and full of characteristic fossils, 60 miles to the west of Shanghai, resting nearly horizontally upon ancient sandstones of great thickness, having a dip of  $20^{\circ}$ , and in which plant-remains had been found.

Von Richthofen's remarks upon Löss formation suggest further examination. In general characters the deposits he describes resemble the great valley deposits of India that we are disposed to call by the same name; and he himself compares it to that of the Rhine valley; yet certain features he mentions of the Löss of the Hoang-ho are peculiar to it as compared with those analogous, at least, with that in India. He describes it as containing well preserved landshells and the bones of fossil animals so abundantly as to be used for manure. This feature may perhaps be connected with, and peculiar to, the mode of formation he suggests for the Löss of that region—from wind-borne materials. He mentions the custom of the people to excavate extensive permanent dwelling places in the steep banks of the deep Löss, which are sometimes from 400 to 500 feet high. The depth of the Löss he estimates at 1500 feet.

In another paper Von Richthofen notices the region of King-te-chin, of porcelain celebrity, east of the Poyang lake, south of the Yang-tse-kiang. The eastern slopes and ridges of the mountains are formed of an extensive sandstone formation resting against and upon porphyries, and on the main ridge capping a great clay-slate formation, which he calls the King-te-chin series. These latter are highly compressed, with a steady W. S. W.—E. N. E. strike. It is in regular bands in these slates that the famous kaolin-rock occurs, the name being that of once famous quarries. It is a hard fine slate, of a green colour, somewhat resembling jade, and when pounded forms a white powder, which is sold in bricks to the porcelain makers. The Chinese still apply this name (Kao-ling, 'high ridge') to the finest quality; an inferior kind being called Pe-tun-tse (white clay). Near Poyang lake, the King-te-chin slates are overlaid by the coal formation, of palæozoic age, from which coal is largely extracted for the steamers on the Yang-tse. He identifies the coal approximately with that found in the northern provinces.

In 1870, Professor Owen described some large mammalian fossils from China. One was alleged to be from marly beds in the neighbourhood of Shanghai; and others, of much fresher aspect, said to be from a cave near the city of Chunts-king-foo in the province of Sze-chuen. As compared with the condition of the Siwálik fossils, these cave bones present an appearance of comparative unchangedness. Yet Professor Owen unhesitatingly ranked them with that fauna, as older pliocene or miocene. Dr. Anderson's mention of an elephantine fossil tooth "not recent," from the "superficial deposits" of the Taping valley, would seem to confirm the circumstances reported of Professor Owen's fossils. It would be most interesting to throw further light upon this question. The fauna of the old river deposits of the valleys of India were broadly distinguished by Falconer from that of the Siwálíks.

#### Zoology.

A member of the party being a Zoologist, it will be unnecessary to offer any suggestions on this head.

#### Botany.

The country lying between the Indian Empire and China is almost unknown from a botanical point of view. Many Japanese species have a range as far as to the Khásia hills, and some of them are found also in the Himálayas. It is of high interest to trace their distribution and to find out whether they are out-runners from a central Chinese Hill-Flora, or whether they are of a truly Japanese origin. In order to come to any reliable conclusions in this regard, every plant, species, herb or wood, should be collected. The characteristic of the Chinese Flora consists chiefly in the great preponderance of woody plants (especially trees), and these should specially be looked for. The hill-ranges bordering Burmah are of a more tropical nature (especially in the valleys), and here the collecting of plants will be rather difficult. Further to the east, after crossing the Salween and Mekong rivers (or probably much earlier), a quite temperate vegetation begins, and many of the plateau-lands of Yunnan proper bear even a poor vegetation, as is shewn by the explorations of the French Mission to Indo-China under Lieut Lagrée. Here the collecting of plants will be as easy as in Europe, and this the more so as the trees are of much lower growth.

It is thought that 20 bundles (each of about  $1\frac{1}{2}$  feet deep) of drying paper will be quite sufficient for the drying and preservation of the plants during the whole tour, but it is suggested that the drying paper should be solely used for drying and not for packing up the dried specimens, for which latter purpose other paper should be used. Collecting duplicates is always a great incumbrance when travelling, and if it is done by a non-expert, it is very usual that the most common things are those that are gathered in larger quantities. It is therefore suggested that of every species only a

few good and complete specimens (not mere fragments) be taken. These should be carefully ticketed and the label should state locality and date, and it should record, if the plant is cultivated or taken from a garden. It depends upon the skill and experience of the collector to make notes on the frequency, range, and elevation of each species. Notes on the colour of the flowers and fruit, uses, etc., are always of great value.

If any opportunity should arise for sending dried collections back to Bhamo, they should be sent by that route as long as the Mission travels on this side of the Salween.

As to what should be taken it may be said, every plant, whether herb, shrub or tree. It would also be desirable that cryptogams should be gathered. The latter can be dried in the same way as phanerogams, but in the case of many Fungi and Algæ a good many manipulations and even microscopical drawings (in the case of Spirogyras, etc.) are indispensable for their future identification.

The dried plants should be put between dry paper and packed in wax cloth (also while travelling), in order to prevent their being spoiled should the rains set in.

A specimen of every plant met with should be preserved, and in order to get an idea of the geographical distribution of species along the entire line of route, a memorandum should be made of the plants seen every day. As the plants will probably be collected by one who does not know the names even of their natural orders, probably the best memorandum in most cases will be to collect a fragment of every species met daily. In other words, a few perfect specimens of each species met with should be collected for (subsequent) determination or description; but besides these, smaller specimens (sufficient for comparison with the perfect ones) should be collected daily, to show geographical distribution. Of course, if accurate notes can be made, the necessity of collecting such fragments is avoided.

A perfect specimen consists, in the case of small species, of an entire plant bearing leaves, flower-buds, expanded flowers, and ripe fruit: in the case of large species, of a small mature branch (young shoots should not be taken) bearing characteristic leaves, and of branches bearing buds, flowers, and ripe fruit. Where a plant bears leaves of two forms, specimens of both should be taken.

Each individual specimen should have attached to it a ticket bearing note of locality, or elevation above sea, and date of collection, also notes of colour of flower, of native name (if it can be got on apparently reliable authority) and of reputed properties and uses, also a note of the parts used. The ticket of *each individual specimen should invariably be attached to it when first put into the drying paper.* Writing tickets at any subse-

quent time usually leads to blundering, and if not attached to specimens, tickets are apt to get mixed in changing the drying paper.

*Succulent fruits* should be preserved in spirit and should have parchment tickets attached with particulars noted, and reference to dried specimens of their leaves. The colour of the ripe fresh fruit should be noted.

When thoroughly dry, plant specimens should be put between sheets of thin dry paper and made up into convenient bundles for transit to the Botanical Garden, Calcutta, by the earliest available opportunity. Wild and cultivated plants should be distinguished.

*Seeds.* Ripe seeds of every plant met with should be collected. They should be exposed to air and gentle heat (the sun's rays are best) until quite dry, and when quite dry should be made in small parcels in dry paper, numbered, and ticketed. Seed parcels should be sent to the Calcutta Botanical Garden by post, in bags (which will be supplied), by every available opportunity.

*Bulbs* (as of lilies), tubers (as of ground orchids) and fleshy underground stems of all sorts should be collected and packed in baskets in dry grass, moss, or lichen.

Baskets are better than boxes as they permit of ventilation. But the contents of these baskets must be *kept dry* during wet weather even at the expense of temporarily preventing ventilation.

Pieces of stems or entire leaves of succulent plants, such as house-leek (*Sedum*), &c., may be preserved alive for months, if treated in the way suggested for bulbs.

Epiphytal orchids should be collected and carried *dry* in baskets.

*Fern Spores*, should be shaken out (if ripe) on an old newspaper, and then collected and made up in small packets. They should be sent to the Botanical Garden, Calcutta, by post.

*Ripe Cones of Firs*, should be kept tied up with string until the seeds naturally fall out. When this occurs, the cones, except a few for specimens, may be thrown away and the seeds alone kept.

*Dye Stuffs and Vegetable Medicines*, also *Substances used in the Arts*. Specimens with all available reliable particulars should be collected in bazars or elsewhere; and, wherever possible, perfect botanical specimens of the plants producing them with the native name of the *plant* itself.

*Paper.* Specimens of, and of the material from which made.

*Food Stuffs.* Specimens of and of plants producing them.

*Rhubarb.* (Medicinal): seeds and specimens of plants producing.

*Camphor.* Specimens of the various sorts with full particulars of mode of extraction and specimens of the plants whence derived.

"*China Root.*" Said to grow in the provinces of Honan, Kwangtung, and Kwangsi. Specimens of product and of plant.

*Root called "Green Putchuk."* Said to be product of an *Aristolochia*. Specimens of and of the plant producing.

*Cassia Bark.* Specimens of the tree producing, with good samples of the bark (old and young), and from the same tree.

*Cassia Buds.* Do. Do.

*Bamboos.* Seeds of in quantity. There are some specially desirable, small sorts, and some large with yellow and striped stems.

*Cardamoms.* Specimens of the sorts undernoted and of the plants producing them. *N. B.* Living Rhizomes of the plants should be collected for introduction of the species to Indian cultivation.

*Yang-chun-sha.* Hairy China Cardamom : said to be grown in Province of Kwang-tung.

*Tsaou Kow.* Large round Cardamom.

*Yih-che-tsze.* Bitter seeded Cardamom.

*Tsaou-kwo* or *Quá-len.* Ovoid China Cardamom.

*Cryptogamic plants.* Mosses and Lichens should be gathered in fructification if possible. Each species should be either dried like a flowering plant or wrapped up in a separate paper-parcel.

*Algae* should be well washed and dried like flowering plants, but with little pressure.

*Tea and Tea Culture.* Observations might be made on the mode of culture and manufacture, and seed should be collected of any particular variety of merit.

*Fibres.* Specimens of and of plants producing.

*Oranges.* Seeds of all varieties met with, and any good information as to culture.

*Horticulture.* The Chinese being very skilful gardeners, observations and notes might be made on any striking or novel modes of culture.

*Opium.* Information as to the cultivation of in China, with specimens of the drug itself and of the plant yielding it.

### Sanitation.

With reference to the questions of a sanitary character which it would be possible for the Native Assistant-Surgeon accompanying the Yunnan Mission to investigate, whilst carrying on the ordinary duties of Medical Attendant, it is suggested that as much definite information regarding the following diseases should be collected as may be possible; and that it should be carefully recorded at the time that it was obtained :—

1. *Cholera.* If epidemic or endemic. How long known to have existed: What time of the year present: Nature of the district as to elevation, soil, water, &c.? the treatment: To what causes attributed by the inhabitants?

2. *Small-pox*. If present, to what extent prevalent and at what season : If inoculation is resorted to ?

3. *Fevers*. Malarial ; typhus ; typhoid ; scarlatina. Treatment adopted for Ague.

4. *Goitre*. If observed in mountainous districts to what extent prevalent ; and, if at low elevation, whether the water of the district was hard or soft ?

5. *Dysentery*. If of a very fatal character ; and the treatment adopted in the various districts ?

6. *Urinary Calculi*. To what extent prevalent and the remedial means adopted.

7. *Syphilis*. If of a very virulent kind ; to what extent prevalent ; and, is mercury employed in its treatment ?

8. *Elephantiasis*.

9. *Leprosy*.

10. *Guinea Worm*.

Any further information that could be obtained concerning the diseases and food-supplies of the people.

It would also be very desirable that samples of any special remedial agents which are met with should be preserved, when their nature could not be ascertained at the time.

### Photography.

The most satisfactory dry process Capt. Waterhouse has worked is the following. It is simple, and the materials for the preservative are obtainable anywhere.

#### I. *Preparation of the Plates.*

The plates must be carefully cleaned and coated on *one side* only with the following mixture :—

Albumen,..... 1 ounce.

Water,..... 40 ounces.

or one Indian egg to a wine-bottle of water, well shaken, and carefully filtered. After being coated with this, the plates are set aside to dry in a place quite free from dust.

#### II. *Sensitising the Plates.*

The plates are coated on the albumenised side, in the ordinary way, with a good bromo-iodised Collodion (a mixture of Thomas' and Mawson's bromo-iodised Collodions, with the addition of 2 grains of bromide of cadmium to the ounce, gives good results) and immersed in a 45-grain silver bath for about 5 minutes. After which the plate is soaked in four successive

baths of distilled water for 5 minutes each. (If distilled water is not easily available, common water, if tolerably pure, may be substituted for the distilled water in the last three baths), and then immersed in a dish containing the following preservative carefully filtered, or if this is inconvenient, the mixture may be poured on and off the plates once or twice, taking care to avoid bubbles.

Decoction of Coffee,..... 2 pints (1 ounce of coffee.)

Sugar, ..... 3 drams.

White of one egg.

The plates are allowed to remain a few minutes in this and then removed and set up to drain on clean blotting paper and allowed to dry in a box or other place free from dust. Plates so prepared are said to keep for some months in Europe, but I have no experience how long they would keep in an Indian climate.

### III. *Exposure.*

For the exposure no certain rule can be given, but I find the plates require about twice or three times the exposure of wet plates, and about 1 minute would probably be the exposure for small plates, such as would be carried on an expedition, travelling as lightly as possible. This, however, must be tested beforehand.

### IV. *Development.*

The plates are first of all flushed with a mixture of equal parts of spirits of wine and water, and then well washed with clean water.

Supposing the plate to be  $\frac{1}{2}$  size, or  $4\frac{1}{2}'' \times 3\frac{1}{2}''$ , take 2 drams of a solution of—

I.—Pyrogallie acid, ..... 12 grains.

Water,..... 1 ounce.

and pour it over the plate and back into the developing cup, then add two or three drops of a mixture of

II.—Strongest Liquor Ammonia,..... 1 part.

Water, ..... 4 parts.

and one drop of

III.—Bromide of Potassium,..... 4 grains.

Water, ..... 1 ounce.

and again apply to the plate. If a proper exposure has been given, the details will at once become visible and gradually gain strength, till all possible detail is out. Should, however, the plate have been *under exposed*, and the details be slow in appearing, a drop or two more of No. II. must be added, but if the plate has been much over-exposed and the details flash out, it may be advisable to at once add a drop or two of No. III.

When all detail has been brought out by this preliminary development, the plate is again washed and flowed over with 2 drams of the pyrogallie solution, No. I., to which have been added six drops of a solution of

IV.—Citric acid, .....	60 grains.
Glacial acetic acid, .....	30 minims.
Water, .....	1 ounce.

This is poured back again into the developing cup and two or three drops of

V.—Nitrate of Silver, .....	20 grains.
Water (distilled), .....	1 ounce.

having been added, it is again applied to the plate and the details, previously very thin and scarcely visible by *transmitted* light, gradually acquire a sufficient density for printing purposes.

Should the intensification be slow by reason of under-exposure, a drop or two more of No. V. may be added from time to time, a drop of No. IV. accompanying each such addition. The plates may then be fixed, after washing, with a weak solution of cyanide of potassium or hyposulphite of soda. Should they appear too weak after fixing, the intensifying operation last described may be repeated, but over-intensification should be guarded against as the pictures are sometimes more dense actually than they appear to the eye.

Great care should be taken to keep prepared sensitive dry plates perfectly dry and free from moisture, and also to preserve them from any influence of light.

The Year Books of Photography and Abney's Instructions in Photography will give full instructions regarding dry and wet-plate photography.

The President also announced the receipt of a communication from Mon. Lucien Adam, Nancy, inviting the Society's co-operation in promoting the objects of the *Congrès Internationale des Americanistes*, and laid the papers connected with the subject on the table.

Mr. Blochmann laid his readings and translations of the following inscriptions before the meeting:—

#### Jaunpúr.

General Cunningham, C. S. I., has favoured the Society with a rubbing of the inscription on a pillar in front of the Masjid in Jaunpúr Fort. The inscription consists of six lines, of which the second is almost entirely illegible. The historical portions, however, are clear.

The inscription commemorates the erection of a mosque in 778, or 1377, A. D. by Ibráhím Náib Bárbak, whom Zíá uddín Baraní states to have been Fírúz Sháh's brother.



بسم الله الرحمن الرحيم انما يعمر مساجد الله من آمن بالله و اليوم الآخر  
 و قال رسول الله صلى الله عليه وسلم من بنى مسجدا لله تعالى اعطاه الله بكل  
 شبر ..... سلطان سلاطين عالم شهريار عادل اعظم مالك  
 رقاب الامم مولى ملوك العرب والعجم مظهر كلمة الله العليا المتبسك بالعروة  
 الوثقى الناظر لادين الله الحافظ لبلاد الله الحامى لعباد الله ذو الامن و الامان  
 لاهل الايمان وارث ملك سليمان . . . ابوالمظفر فيروز شاه السلطان خلد الله  
 ملكه و سلطانه و بزمان ملك ملوك الشرق والصين سلطان السلاطين ناصر الغزوة  
 الموحدين عمدة الامام عدة الايام سدهكش زمان . . . الخ اعظم ابراهيم نايب  
 باربك سلطان يديم الله معاليه بشرف كارفرمائى اين عالي مقام مشرف گشت  
 اين ملك نيكوسيرت صافي اعتقاد باتمام اين بناء خير جهد تمام فرمود بمانه ذواقعد  
 معظم و بسال هجوي نبوي صلى الله عليه وسلم ثمان و سبعين و سبعماية ١١

In the name of God, the merciful, the clement. Surely, he will build the mosques of God who believes in God and the last day [Qorán]. And the Prophet (blessings upon him) says, 'He who builds a mosque for God, will receive from God every gift....[In the reign of] the king of the kings of the world, the just and great ruler, the lord of the necks of nations, the master of the kings of Arabia and Persia, who professes the exalted creed and seizes the firm handle, who watches over God's faith, protects God's lands, and defends God's servants, who gives the Faithful peace and security, the heir of the kingdom of Solomon, . . . A b u l M u z a f f a r F í r ú z Sh á h, the king—may God perpetuate his kingdom and his rule! and in the time of the Malik of the Maliks of the East and of China, the king of kings, the helper of the warring monotheists, the excellent Imám, the hope of the age, the general of the present time, . . . the great U l u g h I b r á h í m N á i b B á r b a k, the king,—may God continue to him his high position!—(this building) received the distinction of being erected, and this Prince, whose walk of life is good and whose faith is pure, exerted himself to the utmost to finish this religious edifice. In the exalted month of Zil Qa'dah and in the year 778 of the Flight of the Prophet, upon whom rest God's blessings [April, 1376].

Shams i 'Afif has a long chapter on Ibráhím Náib Bárбак, in which he says that he was so attached to his brother Fírúz Sháh and the latter to him, that both slept in the same room, waited for each other when commencing to chew betel, and that he died before Fírúz Sháh. Then follow similar puerilities in schoolboy style, adorned with two quotations from Sa'dí. The chapter has been deservedly left out by Prof. Dowson (Elliot's *Historians*, III, p. 372.)

Tilbégampūr, Pargana Sikandarabad, S. E. of Dillí.

Mr. E. T. Atkinson, C. S. sent the Society a reading of the following inscription found on the facing of an old well in Mauza' Tilbégampūr.

بسم الله الرحمن الرحيم

این جاء و چنهال در عهد ظل الله فی العالمین محمد همایون بادشاه غازی  
خلد خلافتہ بدولت و عون همت شجاع الدین امیر فقیر علی بیگ بهادر بنیاد  
ساخت مهتاد تو این باسدها کہتری بتاریخ غرة يوم الجمعة فی شهر جمادی الثاني  
سنه خمس اربعین تسع مایه ۱۱

श्रीगणेशाय नमः ।

अविरलमदजनिवर्चं भ्रमरकुलानेकसेवितकपोलं ।

अभिमतफलदातारं कामेशं गणपतिं वन्दे ॥ १ ॥

अथ शुभसंवत्सरेऽस्मिन् श्रीष्टप विक्रमादित्यराज्ये संवत् १५८५ शके १४६० वर्षे  
मार्गशिरसासे शुक्ले पक्षे दशमीतिथौ शनिवासरे उत्तरानक्षत्रे वरिधाननामयोगे शुभमुहूर्ते  
वत्सलानराज्य योगिनीपुरे पतिसाहज्जमाजं आज्ञा प्रवर्तमाने तस्य आज्ञाकारी अमीर  
फकीरअलीबेग वर्तमाने ॥ क्षत्रियान्वे । गडियलपुरे गोत्रे श्रीश्याम तत्पुत्रादिना तस्य पुत्र  
राजाधिराज परमवैष्णव । षट् दर्शन आसीत तत्पुत्र सहतादित्य वापकारिका ।  
वाहीकरार्द्र । आचन्द्रार्कात् पुत्रपौत्रैः सद्यः शुभं भूयात् ॥

*Persian Translation.*

This well and this aqueduct was made during the reign of the shadow of God in the world Muhammad Humáyún Pádisháhi Ghází, may his sovereignty be perpetuated! and with the auspicious help and approval of Shujá' uddin Amír Faqír 'Alí Beg Bahádur by Mahatádittá, son of Básdahá, the K'hatri, on Friday, 1st Jumáda II, 945 [26th October, 1538].

*Hindī-Sanskrit Translation.*

Obeisance to Sri Ganesa! I bow to him whose cheeks are frequented by numerous black bees, attracted by the everflowing *mada* juice, who is the dispenser of desirable fruits, who is the lord of desires and the chief of the ganas.

In this auspicious year, in the year of the era of the reign of Prince Vikramáditya, 1595, Sak era 1460, in the month of Agra-hayána, in the bright phase of the moon, on her tenth day, Saturday, in the constellation Uttara, in the Yóga variyán, in an auspicious moment, in the under-mentioned dominion, Jagini Pura, when the rule of Emperor Humáyún was enforced, during the lifetime of his order-bearer Amír Fakír Alí Beg, in the village Gariyal in the family of Syama Mahatádittá well versed in six darsanas, a great Vaishnava prince made this well, and opened it to the public, with the view of securing the prosperity of his sons and grandsons so long as the sun and the moon endure.





The following letter from Mr. G. H. Damant, C. S. was read:—

CACHAR, December 6th, 1874.

MY DEAR MR. BLOCHMANN,

I have found here some MSS. in a character I cannot read. I am told there are a few old Manipuris who can read it, but I have not succeeded in finding one yet. One of the MSS. is said to contain a history of Tipperah and might be interesting historically, but I am at present puzzling over the alphabet. If you could give me any assistance I should be extremely obliged. I give some of the letters which Mr. McWilliam obtained from a Manipuri, but I cannot answer for their correctness.

The alphabet is not complete, but these specimens may be enough to identify it. I give also a bit of the MS. as near as I can copy it. (Plate I.)

The following papers were read:—

1. *The Etymology of Local names in Northern India, as exemplified in the District of Mathurá.*—By F. S. GROWSE, M. A., B. C. S.

The paper will be published in No. IV. of the Journal, Pt. I, for 1874.

2. *On an apparently unnamed species of Phœnicopterus.*—By W. EDWIN BROOKS, C. E.

(Received Nov. 26th, 1874).

A considerable number of Flamingos have been shot during the last few years by my friend Mr. Anderson, of Futtehgurh, who, after a careful examination of the series, has come to the conclusion that two large but closely allied species of Flamingo are to be found in India. Not only were old birds in fine rosy plumage procured, but also immature of both; and the specific distinctness of each was manifest. Mr. Anderson wishes me to describe the new, or rather the long overlooked flamingo, and I therefore do so as

PHENICOPTERUS ANDERSONI, n. sp.

General coloration similar to that of *P. antiquorum* (*P. roseus*) but of a much paler rosy colour, the whole head, neck, breast, and lower parts, as well as back and tail, being considerably less tinged with rose-colour than in *P. antiquorum*; red portions of wing not so bright; axillaries, which are wholly carmine in *P. antiquorum*, are very pale rosy, tipped with brown; primaries and secondaries, which are black in *P. antiquorum*, are dark brown and sometimes only moderately brown, the depth of the colour depending upon the season and upon the age of the feather; *coverts to primaries white, edged with pale brown on the inner web, and broadly tipped with the same colour; coverts to secondaries, or the greater coverts, as they are usually called, white, broadly tipped with a rather darker brown; both these wing-coverts in P. antiquorum, are wholly rose colour: the difference in wing-coverts forms the principal distinction by which Mr. Anderson's species can*

be easily known: the white feathers of the head and neck when turned back are found to have the basal and larger portion of a grey colour; but in *P. antiquorum*, the adults have these feathers white to their very bases: this forms another very good distinction between the two species: the bill is very similar in both but, being somewhat the larger of the two, *P. Andersoni* has a proportionately larger one; the chin feathers, however, advance towards the lower mandible in a much more obtuse angle; the legs and feet are duller and paler.

Length of a male, 50 in. wing 16·9; tarsus 14·75; bare portion of tibia 10 in.; of a female, length 43 in.; wing 15 in.; tarsus 11·75 in.; bare portion of tibia 8 in.

Dimensions of *P. antiquorum* (male), wing 16·5; tarsus 12·75; bare portion of tibia 10·25; female, length 40; wing 14; tarsus 10·25; bare portion of tibia 7·5 in.

Two or three years ago, I sent examples of each of these birds to England, and the conclusion arrived at by some of the best authorities there was, that they were one and the same bird; the more rosy one being a more advanced stage of the paler. But from the number of each which I have examined, I have full confidence that *P. Andersoni* will never put on the full rosy plumage of *P. antiquorum*. That the species will be attacked, and weighty names brought to bear against it, I do not doubt; but a satisfactory test of the correctness of my conclusion as to the validity of the two species is only to be attained, I submit, by careful observation of an individual of each during its passage through all its stages in confinement. Apart from the prominent distinctions already pointed out, the colour of the primary quills cannot be so much affected by age in any one species as to present so great a difference as that which exists between the two under consideration. There is another point which I should mention. Blyth appears to have given the name of *P. antiquus* to an Indian flamingo; but whether this was to the well known species or to another, I have no means of finding out. Evidence may eventually be forthcoming to clear this point up, when *P. Andersoni* may become a synonym of *P. antiquus*; but in the meantime, I have thought it most convenient to define the unnamed bird so long confounded with *P. antiquorum*.

The immature of each is very distinct, but detailed descriptions would make this paper tedious.

4. *Description of four new species belonging to the family Stenopidae from the N. E. Frontier of Bengal, with drawing of Helicarion gigas, Benson and a variety of the same.*—By MAJOR H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

The paper will be published in the Journal Part II, 1875.

## LIBRARY.

The following additions have been made to the Library since the meeting held in December last.

## Presentations.

\* \* \* Names of Donors in Capitals.

Proceedings of the Zoological Society of London, for the year 1874, Parts II and III.

Part II.—*The Secretary*—Announcement of the arrival in the Society's Menagerie of a Javan Rhinoceros (with plate). *The Rev. S. J. Whitmee*—Letter relating to a *Didunculus* and two Curlews sent to the Society's Collection, and to the habits of *Parundiastes pacificus*. *T. H. Huxley*—On the Structure of the Skull and of the Heart of *Menobranchus lateralis*. *Capt. W. H. Unwin*—On the Breeding of the Golden Eagle (*Aquila chrysaetos*) in North-western India. *Lieut. R. W. Ramsay*—Description of a new Species of Wood-pecker from British Burmah. *W. T. Blanford* and *H. E. Dresser*—Monograph of the Genus *Saxicola*, BECHSTEIN, with plates. *W. T. Blanford*—Exhibition of, and remarks upon Horns of the Wild Goat of Persia (*Capra agagrus*), and of Horns of the same animal from Sind.

Part III. *A. H. Garrod*—On some points in the Anatomy of the Columbe. *Frederic Moore*—List of Diurnal *Lepidoptera* collected in Cashmere Territory by Capt. R. B. Reed, 12th Regt., with descriptions of new Species. *A. G. Butler*—List of the Diurnal *Lepidoptera* of the South-Sea Islands. *Prof. Newton*—Exhibition of two letters, the property of J. B. Wilmot, Esq., M. D., referring to a live Dodo. *W. C. McIntosh*—Notice of a memoir on the *Annelida* collected during the 'Porcupine' Expeditions of 1869 and 1870. *G. E. Dobson*—Notes on the Respiration of some Species of Indian Freshwater Fishes. *Dr. Ed. Grube*—Descriptiones Annulorum novorum mare Ceylonicum habitantium ab honoratissimo Holdsworth collectorum. *The Rev. O. P. Cambridge*—On some new Species of *Drassides*. *Dr. James Murie*—On the Nature of the Sacs vomited by the Hornbills. *Dr. F. Stoliczka*—Description of the *Ovis poli* of Blyth. *Alfred Newton*—On a Living Dodo shipped for England in the year 1628. *R. Swinhoe*—On a small Tufted Hornless Deer from the Mountains near Ningpo. *J. E. Harting*—On the Eggs of some little-known *Limicole*.

Transactions of the Zoological Society of London, Vol. VIII, Part 9.

*J. Murie*—Researches upon the Anatomy of the *Pinnipedia*:—Descriptive Anatomy of the Sea-Lion (*Otaria jubata*).

## THE ZOOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society. Vol. 37. Part III. September, 1874.

*Sir Charles W. Dilke*—Local Government among Different Nations.

## THE STATISTICAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society of London, Vol. XVIII.

No. V. Address by the Right Hon'ble Sir H. Bartle Frere.

## THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

The Geographical Magazine. No. IX., for December, 1874.

The Arctic Expedition.—Irrigation in Southern India. The Tamraparni System.

THE EDITOR.

Bulletin de la Société de Géographie, September and October, 1874.

September. *Wilson* :—Préparatifs de l'expédition scientifique Russe de l'Amour-Daria. *H. Duveyrier*—Livingstone. *E. de Bellomayre*—Notice sur le stadiomètre géographique, (with illustration).

October. *Ch. Weyprecht et J. Payer* :—Expédition austro-hongroise au pôle nord de 1872 à 1874 (avec deux cartes dans le texte).

THE GEOGRAPHICAL SOCIETY OF PARIS.

Proceedings of the Academy of Natural Sciences of Philadelphia. Parts I and II. January to September, 1873.

Part I. *W. H. Dall*—Catalogue of the Recent Species of the Class *Brachiopoda*.

Part II. *E. D. Cope*—On an Anorous Batrachian from the Eocene of Wyoming. *Andrew Garrett*—Descriptions of a new species of *Goniadoris*. *Andrew Garrett*—Descriptions of new species of Marine and Land Shells inhabiting the South Sea Islands. *Theodore Gill*—On the Affinities of the Sirenians. *Thos. G. Gentry*—Influence of Nutrition on Sex among the Lepidoptera. *John L. Leconte*—Synonymical Remarks upon North American Coleoptera.

Journal of the Academy of Natural Sciences of Philadelphia. New Series. Vol. VIII. Part I.

*Isaac Lea*—Description of fifty-two Species of *Unionida*. *Edw. D. Cope*—On the Homologies and Origin of the Types of Molar Teeth of *Mammalia* *Educabilia*.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Mémoires de la Société D'Ethnographie. Vol. 12 2<sup>e</sup> partie 1873.

*Léon de Rosny*—Extraits du Ti-Tou Tsoung-yao relatifs aux peuples étrangers à la Chine.

THE ETHNOGRAPHICAL SOCIETY OF PARIS.

Aarboger for Nordisk Oldkyndighed Og Historie, udgivne af det kongelige Nordiske Oldskrift-Selskab. Hefte III and IV. 1873.

THE ROYAL UNIVERSITY OF NORWAY.

Atti della Reale Accademia Delle Scienze di Torino. Vol. IX. Disp. 2 and 3, 1814.

Disp. 2. *Lessona e Tapparone-Canefri* :—Nota Sulla *Macrocheira Kaempferi* SIEB. e sopra una nuova specie del genere *Dichelapsis* Cossa—Comunicazione intorno alla germinazione dei semi nel protossido d'azoto.

Disp. 3. *Luvini*—Di un nuovo strumento meteorologico-geodetico-astronomico il *Diateroscopio*. *Salvadori*—Intorno al Genere *Cymberhynchus* VIGORS.—Nuovo specie del Genere *Cracticus* VIEILLLOT.

THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Bulletin de la Société Impériale des Naturalistes de Moscow, 1873. No. IV.

*Prof. Th. Bredichin*—Observations spectroscopiques du Soleil faites pendant l'été et l'automne de 1873. *Prof. A. Stoletow*—Notiz über die Magnetisirungsfunktionen



verschiedener Eisenkörper. *Victor Motschoulsky*—Énumération des nouvelles espèces de coléoptères rapportés de ses voyages.

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.  
Dictionnaire Français-Cambodgien. By E. Aymonier.

THE AUTHOR.

Stray Feathers. Edited by Allan Hume. Vol. II. No. 6.

A First List of the Birds of the Tenasserim Provinces. *R. B. Sharpe*—Note on *Carcineutes qmabilis*, HUME. *Megalaima incognita*, HUME. *Lophophorus Selateri*, JERD. *R. B. Sharpe*—Note on *Pelargopsis intermedia*, HUME. Additional Notes on the Avifauna of the Andaman Islands. *R. B. Sharpe* :—Catalogue of the *Accipitres*.

THE EDITOR.

Memoirs of the Geological Survey of India. Vol. XI. Part I.

*F. R. Mallet*—On the Geology of the Darjiling District and the Western Duars.

Records of the Geological Survey of India. Vol. VII. Part 4, 1874.

*R. B. Foote*—The Auriferous Rocks of the Dambal Hills, Dharwar District. *W. Theobald* :—Remarks on certain considerations adduced by Falconer in support of the Antiquity of the Human Race in India. *V. Ball*—Geological notes made on a visit to the Coal recently discovered in the country of the Luni Pathans, south-east corner of Afghanistan. *William King*—Note of the progress of Geological investigation in the Godavari District, Madras Presidency. *Theodore W. H. Hughes*—Notes upon the subsidiary materials for Artificial Fuel.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

The Calcutta Journal of Medicine. (Edited by Mahendra Lala Sarcar, M. D.) Nos. 8 and 9, Aug. Sept. 1874.

The Editor—The Garjan Oil treatment of Leprosy.

THE EDITOR.

The Christian Spectator. Vol. IV. No. 42. December, 1874.

THE EDITOR.

Annual Report of the three Lunatic Asylums in the Madras Presidency during the year 1873-74.

Annual Report of the Madras Medical College, Session 1873-74.

THE GOVERNMENT OF MADRAS.

A Classified Alphabetical Catalogue of Sanskrit MSS. in the Central Provinces, by Dr. F. Kielhorn.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Conchologia Indica; Part V.

English-Russian Grammar, or Principles of the Russian Language, for the use of the English. By Charles Philip Reiff.

Ornithologie Européenne, ou Catalogue Descriptif, Analytique, et Raisonné des Oiseaux observés en Europe. By C. D. Degland and Z. Gerbe. Vols. I and II.

Sixth Annual Report of the United States Geological Survey of the Territories embracing portions of Montana, Idaho, Wyoming, and Utah;

being a report of progress of the Explorations for the year 1872. By F. V. Hayden.

Lahore to Yarkand. By Geo. Henderson, M. D. and Allan O Hume, Esq., C. B.

The Birds of India. By T. C. Jerdon, Surgeon Major, Madras Army. In three volumes.

Grammar of the Persian Language. By Duncan Forbes, LL. D.

A Compendium of Domestic Medicine. By John Savory.

Dr. Hooper's Physician's Vade Mecum. By W. Augustus Grey, M. B.

Johnson's Dictionary of the English Language. (Pocket Edition.)

First, Second, and Third Annual Reports of the United States Geological Survey of the Territories for the year 1867, 1868, and 1869, under the Department of the Interior.

Boletin del Museo Publico de Buenos Aires, Nos. I and VI.

Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College. No. VII. Revision of the Echini. By A. Agassiz, Parts I and II, with 49 plates.

Stray Feathers. Vol. I. Nos. 1-6 and Vol. II.

Sitzungs-Berichte der Naturwissenschaftlichen Gesellschaft Isis in Dresden. For 1871, 1872 and first quarter of 1873.

On the Systematic Position of the *Brachiopoda*. By Edw. S. Morse.

Seventh Account of New Species of Snakes in the Collection of the British Museum. By A. Günther, M. A., M. D.

On some Persian, Himalayan, and other reptiles. By J. Anderson, M. D.

Note on a hitherto unpublished Drawing in the Buchanan-Hamilton Collection, representing *Barbus Beavani*. By Dr. Albert Günther.

Notes on 'Stray Feathers.' By W. T. Blanford.

Descriptions of new Land and Freshwater Shells from the Khási, North-Cachar, and Nágá Hills, N. E. Bengal. By Major Godwin-Austen.

Note on the Gazelles of India and Persia, with Descriptions of a new Species. By W. T. Blanford.

Descriptions of some Ceylonese Reptiles and Batrachians. By Dr., Albert Günther.

On the Nature and Probable Origin of the Superficial Deposits in the Valleys and Deserts of Central Persia. By W. T. Blanford.

Notes on the Synonymy of some Indian and Persian Birds, with descriptions of two New Species from Persia. By W. T. Blanford, (2 copies).

Notes on some Rodents from Yarkand. By John Anderson, M. D., Curator of the Indian Museum, Calcutta.

Examination of certain "Remarks on Indian Fishes" made by Mr. Francis Day in the "Proceedings of the Zoological Society." By Albert Günther.

On two Species of *Hydrosaurus* from the Philippine Islands. By Albert Günther.

On the Reptiles and Amphibians of Borneo. By Dr. Albert Günther. Conchological Memoranda. No. XII.

The Pectens, or Scallop-Shells. By R. E. C. Stearns.

Descriptions of Seventeen New Species of Land and Marine Shells. By Henry Adams.

Hand-List of the Specimens of Shield Reptiles in the British Museum. By Dr. J. E. Gray.

On the Land-Shells of Penang Island, with descriptions of the Animals and Anatomical Notes. Part Second, *Helicacea*. By Dr. F. Stoliczka. 37 copies.

Notes on Burmese and Arakanese Land Shells, with descriptions of a few Species. By W. Theobald and Dr. F. Stoliczka.

Notes on some Indian and Burmese Ophidians, by Dr. F. Stoliczka.

On *Aquila Bifasciata* and *Aquila Orientalis*, by W. E. Brooks, C. E.

Notes on the Ornithology of Cashmir, by W. E. Brooks, C. E.

Contribution to our Knowledge of *Ceratophrys* and *Megalophrys*. By Albert Günther.

Ueber das Wachsthum von *Lymnaeus Stagnalis*. By Prof. C. Semper.

Proceedings of the Asiatic Society of Bengal, Nos. 5 and 7, 1872. 7 to 10, 1873. No. 1, 1874.

Journal of the Asiatic Society of Bengal, Part I. Nos. 1 to 4, 1873 and No. 1, 1874. Part II. No. 1, 1868, No. 3, 1872, Nos. 2 to 4, 1873, (No. 3 duplicate), and No. 1, 1874.

#### STOLICZKA BEQUEST.

##### Purchase.

The American Journal of Science and Arts. Vol. VIII. No. 45, September, 1874.

Alfred M. Mayer—Researches in Acoustics.

The Annals and Magazine of Natural History Vol. 14. No. 82, October, 1874.

Dr. J. E. Gray—On the General *Paradoxurus*, *Platyschista* and *Paguma*, and Notes on some Species lately received in the British Museum. H. J. Carter—Descriptions and Figures of Deep-sea Sponges and their Spicules from the Atlantic, dredged up on board H. M. S. 'Porcupine,' chiefly in 1869: with Figures and Descriptions of some remarkable Spicules from the Agulhas Shoal and Colon, Panama. John Scott—On a Collection of Hemiptera Heteroptera from Japan. Descriptions of various new Genera and Species. Messrs. Parker, Jones and Brady—On Priority in the Discovery of the Canal-system in Foraminifera. J. Leidy—Remarks on the Revivification of *Rotifer vulgaris*.

Quarterly Journal of Microscopical Science, October, 1874. No. 56.

F. M. Balfour—A Preliminary Account of the Development of the Elasmobranch

Fishes, (with plates). *E. Ray Lankester*—Observations on the Development of the Pond-snail (*Lymnaeus stagnalis*) and on the Early Stages of other Mollusca. *E. A. Schäfer*—Description of an Apparatus for Maintaining a Constant Temperature under the Microscope.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. October, 1874. Vol. 48, No. 318.

*Alfred M. Mayer*—Researches in Acoustics. *James O'Kinealy*—On a New Formula in Definite Integrals. *Fred. Guthrie*—On an Absolute Galvanometer. *L. Schwendler*—On Earth Currents.

The Numismatic Chronicle and Journal of the Numismatic Society, 1874, Part II. No. 54.

Journal of the Society of Arts. Vol. XXII. Nos. 1138 to 1142, Sept. and Oct. 1874.

No. 1139. The Tea Industry of Bengal. The Bamboo.

No. 1140. The Japanese Mint.

No. 1142. Trans-Himalayan Routes.

The Westminster Review. No. 92. October, 1874.

Indian Public Works:—The Non-responsibility of the Indian Government Officials.

Mind and Body. The Theories of their Relation. By Alexander Bain, LL. D.

The Forms of Water in Clouds and Rivers, Ice and Glaciers. By John Tyndall, LL. D., F. R. S.

Responsibility in Mental Disease. By Henry Maudsley, M. D.

The New Chemistry. By Josiah P. Cooke.

Index of Spectra. By W. Marshall Watts, D. Sc.

Animal Locomotion, or Walking, Swimming, and Flying, with a dissertation on Aëronautics. By J. Bell Pettigrew, M. D.

The Conservation of Energy, being an elementary treatise on Energy and its Laws. By Balfour Stewart, M. A., LL. D.

The Study of Sociology. By Herbert Spencer.

Foods. By Edw. Smith, M. D.

The Science of Law. By Sheldon Amos, M. A.

Physics and Politics, or Thoughts on the application of the Principles of 'Natural Selection' and 'Inheritance' to Political Society. By Walter Bagehot.

The Mechanical Principles of Engineering and Architecture. By Henry Mosely, M. A., F. R. S.

Essays on the Languages, Literature, and Religion of Nepal and Tibet: together with further papers on the Geography, Ethnology, and Commerce of those Countries. By H. B. Hodgson, Esq.

Revue des Cours Scientifiques de la France et de l'Etranger. From 1863 to 1870, 7 Vols.

La Revue Scientifique de la France et de l'Etranger, Revue des Cours Scientifiques (2nd series). From July 1871 to June, 1874, 6 Vols.

Dictionary of Chemistry, 5 vols., with Supplement. By Henry Watts.

Revue des Deux Mondes, 15th Sept. and 1st Oct. 1874.

Journal des Savants. August and September, 1874.

Comptes Rendus Nos. 9 to 13, 1874.

No. 9. *M. P. Monillefert*—adresse quelques observations sur l'emploi des principaux insecticides essayés au laboratoire de Cognac et sur les vignes des environs.

No. 10. *M. Gruzy*—Observation d'un passage extraordinaire de corpuscules sur le Soleil.

No. 11. *M. Allégret*—Sur une transformation des équations de la Mécanique céleste.

No. 12. *M. Fordos*—De l'action des liquides alimentaires ou médicamenteux, sur les vases en étain contenant du plomb. *M. A. Lallemand*—Sur la diffusion lumineuse.

Megasthenes' Indica. By Dr. E. A. Schwanbeck.

Culturgeschichte in ihrer Natürlichen Entwicklung bis zur Gegenwart. By Friedrich von Hellwald. Parts 6 and 7.

Reise in Ostindien, in Briefen an Alexander von Humboldt und Carl Ritter. By Leopold von Orlich.

Die Reise seiner Königlichen Hoheit des Prinzen Waldemar von Preussen nach Indien in den Jahren 1844 bis 1846.

Die Erdkunde von Asien. By Carl Ritter, 28 Vols.

Pratna Kamra Nandini or the Hindu Commentator. A Monthly Sanskrit Journal. Vol. VII, No. 6.

### Exchange.

The Athenæum for September, 1874.

Nature, Nos. 263 to 265.

The Indian Antiquary, November, 1874.

*Prof. J. Eggeling*—An Inscription from Badāmi. *Editor*—Dolmens at Konur and Aiholi. *A. C. Burnell*—Pahlavi inscriptions in South India. *Editor*—The Temples of Amarnāth. *G. H. Damant*—Legends from Dinājpur. *Rev. J. Wilson*—The Beni Israel of Bombay. *E. Rehatsek*—An Inkstand with Arabic inscription. Progress of Oriental research in 1872-73. *Dr. J. Muir*—M. Auguste Barth on the State of Indian Society in the time of Buddha. *W. R. Cornish*—Report on the Census of the Madras Presidency 1871. *Max Müller*—Paradise. *Rev. F. Kittel*—Nijaguna.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

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## CONTENTS.

	<i>Page</i>
List of Members of the Asiatic Society of Bengal on the 31st December, 1874, Appendix in February Proceedings, .....	I
Abstract Statement of Receipts and Disbursements of the Asiatic Society of Bengal for the year 1874, Appendix in February Proceedings, .....	XIII
Proceedings for January, 1875, .....	1-26
Do. for February, including Annual Report and Presi- dent's Address, .....	27-56
Do. for March, 1875, .....	57-80
Do. for April,         " .....	81-90
Do. for May,         " .....	91-100
Do. for June,        " .....	101-126
Do. for July,        " .....	127-154
Do. for August,     " .....	155-194
Do. for November,  " .....	195-210
Do. for December,  " .....	211-236
Index, .....	237-255
Meteorological Observations for January to December, 1875.	



# ERRATA.



- Page xxi, for Purchase of Persian Printed Books read editing of Persian works in Bibl. Indica, &c.
- Page 6, line 25, for and who who want read and who want.
- Page 33, line 13, for Nos. X and XI read Nos. XI and XII.
- Page 36, line 3 from bottom, for Kurtz read Kurz.
- Page 37, line 35, for Blindwormas read Blindworms.
- Page 39, line 18, for Ross's read Rosse's.
- Page 43, line 14, for Islam Shah read Islām Sháh.
- Page 44, line 4 from bottom, for Buddist read Buddhist.
- Page 45, line 26, for the 3rd of read of the 3rd.
- Page 46, line 32, for Ghalot read Ghatot.
- Page 58, line 14, for Dr. F. Hendley read Dr. T. H. Hendley.
- Page 60, line 6 from bottom, for Whitely read Whitley.
- Page 62, line 25, for Bann read Banú.
- Page 62, lines 27 and 29, for Chanda read Chándah.
- Page 66, line 24, for Betuia read Betula.
- Page 75, line 25, for Paliography read Palæography.
- Page 77, line 12, for Institutions Lingæ read Institutiones Linguae.
- Page 81, line 13, for La Touch read La Touche.
- Page 85, line 15, for Khasia read Khásia.
- Page 85, line 4 from bottom, for Areano read Ariano.
- Page 91, line 11, for Sada read Soda.
- Page 97, line 13, for Capt. Lewis, read Capt. Lewin.
- Page 97, line 8 from bottom, for "the only female examined," etc., read "the only female examined was, in accordance with the usual rule, longer headed."
- Page 101, line 13, for A. Chennell read T. Chennell.
- Page 112, line 27, for C. S. J. read C. S. I.
- Page 120, line 8, from bottom, for cervicupra read cervicapra.
- Page 139, line 28, for Punkabari and Dalingkot read Pankábārī and Dálingkot.
- Page 156, line 11, for Bonn read Jena.
- Page 165, line 23, for Budami inscription published in the last October number read Morbi Inscription published on page 258, vol. II.
- Page 170, line 38, for Plates II. III. and IV. read Plates III. IV. and V.
- Page 200, bottom line, for F. Stoliczkana read T. Stoliczkana.
- Page 231, line 36, omit the comma after the words 'of the sabre-like appendage.'
- Page 233, line 3 from bottom, for S. Hysibius read L. Hysibius.

NOTE. The Secretaries would be obliged if authors of papers would immediately give information of any mistakes that may have occurred in printing their communications.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR FEBRUARY, 1875.

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The Annual Meeting of the Society was held on Wednesday, the 3rd February, 1875, at 9 o'clock P. M.

Colonel H. Hyde, R. E., President, in the chair.

According to the bye-laws of the Society, the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1875, and appointed Messrs. Waldie and Schwendler, Scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1875.

In submitting their Annual Report on the state of the Society's affairs during 1874, the Council have to congratulate the Society on the fact that its condition, though apparently less flourishing than in 1873, is still satisfactory, both as regards the state of its funds and the number of its paying or effective members.

The number of elections during the year under review has been 35, against 44 of the previous year.

During the year the Society has lost 14 ordinary members by withdrawal, 11 by cancelling and 5 by death, in all 30, leaving a net increase of 5 ordinary members.

At the commencement of 1874, there were 358 ordinary members on the list, but in accordance with the provisions of rule 14, the names of 22 who had been absent from India upwards of three years, and were not likely to return, have been struck off, so that there will now be a total of 336 + 5, or 341 ordinary members on the list.

Of these 341 members, 48 are absent from India, of whom 13 are subscribing members, 3 are life members, thus making a total of 309 paying members, of whom 140 are resident and 169 are non-resident. The name of one of the latter has to be removed to the absentee list under rule 14B.

The table below shows the fluctuations of members during the last ten years, and it will be observed that the number of effective members in the year under report is larger than in any of the preceding years.

Year.	Paying.			Absent.	Total.
		Resident.	Non-Resident.	Non-paying.	
1865	267	136	131	109	376
1866	293	124	169	94	387
1867	307	154	153	109	416
1868	294	159	135	133	427
1869	304	162	142	138	442
1870	266	134	132	148	414
1871	286	112	174	160	446
1872	279	105	172+2 L.M.	159	438
1873	305	116	186+3 L.M.	53	358
1874	312	140	169+3 L.M.	32	344

Among those who have been lost to the Society by death, the Council have to record with great regret the names of Dr. Stoliczka, late Natural History Secretary of the Society, Dr. Bhau Daji of Bombay, Dr. H. B. Buckle, A. Bond, Esq., and Babu Pulin Behary Sen, a Zemindar of Berhampore.

The election of Col. G. A. Searle was cancelled at his own request.

#### INDIAN MUSEUM.

The Council continue to carry out the provisions of Act XVII of 1866 and transfer all Natural History and Archæological specimens received by them to the Trustees of the Indian Museum.

The Trustees on the part of the Society were Mr. W. S. Atkinson, Col. H. Hyde, Col. J. E. Gastrell, and Mr. J. Geoghegan.

#### FINANCE.

The Financial position of the Society, the Council are happy to report, continues in a satisfactory state; for, with the exception of one item, the receipts from all sources shew considerable increase.

The only falling off is in the item of house-rent, but this is easily explained by the circumstance that last year an accumulation of arrears on this account, amounting to Rs. 12,916, were realized and shown in the account under the head of "Building," while this year the income from this source has only been the regular monthly allowance of Rs. 400 per mensem, or Rs. 4,800.

The only item of expenditure requiring special notice is the sum of Rs. 1,134 for repairing some of the most valuable paintings in the Society's

collection, which were in exceedingly bad order. This was noticed in the report for last year and provision was made for the cost.

It is satisfactory to observe that the expenditure during the year falls short of the amount allotted in the Budget estimate, and that the income exceeds the estimate by upwards of Rs. 1,500.

The Finances of the Society would be in a more satisfactory state if members would be more regular in paying up their subscriptions as they fall due; for instance, in the year under notice, the amount of subscription due from 309 members (140 resident paying at 48 Rs. and 169 non-resident paying at 24 Rs.) was Rs. 11,016, besides Rs. 156 realizable from 13 subscribers in Europe, or in all Rs. 11,172; but the amount actually realized on account of subscriptions was only Rs. 7,500, or Rs. 3,672 less than the proper amount, which is a most serious deficiency. The collection of arrears amounted to Rs. 1,229, making the total receipts on account of subscriptions Rs. 8,729. Though this state of things is most unsatisfactory, it should be noticed that the collections are steadily increasing; they exceed the amount of 1873 by nearly Rs. 450 and that of 1872 by about Rs. 1,250.

The other items of increase are those from the sale of the Society's Journals and other publications, the former sale being in excess of the proceeds of 1873 by Rs. 600 and the latter by about Rs. 100.

The assets consisting of—

Government securities, ...	...	Rs. 9,200 0 0
Cash in hand, ...	...	" 161 9 1
Balance in the Bank of Bengal, ...	...	" 6,856 12 2
amount altogether to ...	...	Rs. 16,218 5 3

(exclusive of outstandings amounting to Rs. 8,715, more than two-thirds of which comprise arrears of subscription). Pursuing the plan adopted last year, the Council have funded Rs. 1,500 out of the amount collected from admission fees, and compounding fees from life members.

The following is a Statement of the Receipts and Disbursements of the Society during the last year.

	RECEIPTS.	1873.	1874.
Subscriptions, ...	...	8,296 2 0	8,729 3 0
Admission fees, ...	...	1,424 0 0	1,182 0 0
Publications, ...	...	1,537 0 3	2,126 8 7
Library, ...	...	316 6 6	412 12 6
Secretary's Office, ...	...	9 3 9	23 12 9
Vested Fund, ...	...	238 4 0	449 0 0
Building, ...	...	12,916 2 1	4,800 0 0
Coin Fund, ...	...	24 0 0	0 0 0
Rs. ...	24,761 2 7	Rs. 17,723 4 10	

				Brought over,...	17,723	4	10
Sundries,	...	...	...		2,861	4	2
Balance in the Bank of Bengal, 1873,	...				3,392	14	6
Cash in hand,	...	...	...		893	15	10
					<hr/>		
					Rs...	24,371	7 4

## DISBURSEMENTS.

Publications,	...	...	Rs. 7,270	2	10	7,440	11	8
Library,	...	...	1,518	13	11	2,732	2	9
Secretary's Office,	...	...	2,614	0	4	3,119	8	10
Vested Fund,	...	...	5,975	9	11	1,646	5	5
Building,	...	...	3,539	2	6	919	13	10
Coin Fund,	...	...	0	0	0	266	0	0
					<hr/>			
					20,917	13	6	16,124 10 6
Sundries,	...	...	...	...	1,228	7	7	
Balance in the Bank of Bengal, 1874,	...				6,856	12	2	
Cash in hand,	...	...	...	...	161	9	1	
					<hr/>			
					Rs...	24,371	7 4	

There are two items of expenditure shewn below which call for explanation. The amount spent on the Library, exceeding the outlay of 1873 by about Rs. 1,200, includes the expenditure of Rs. 1,134 incurred in repairing and restoring the oil paintings. The excess of Rs. 500 in the establishment of the Secretary's office has arisen from the addition of a new clerk on Rs. 60 a month from the month of August last and extra charges incurred for keeping the Library open on Friday mornings.

The following is the Budget of Income and Expenditure for 1875.

## INCOME.

Subscriptions	...	...	...	Rs. 8,000	0	0
Admission Fees	...	...	...	" 1,000	0	0
Publications	...	...	...	" 1,500	0	0
Library	...	...	...	" 300	0	0
Vested Fund	...	...	...	" 400	0	0
Building	...	...	...	" 4,800	0	0
Sundries	...	...	...	" 500	0	0

Rs. 16,500 0 0



## EXPENDITURE.

Publications	...	...	...	Rs. 7,500	0	0
Secretary's office	...	...	...	" 3,500	0	0
Building repairs	...	...	...	" 500	0	0
Do. Taxes	...	...	...	" 500	0	0
Coin Fund	...	...	...	" 500	0	0
Library	...	...	...	" 3,000	0	0
Sundries	...	...	...	" 500	0	0
Balance	...	...	...	" 500	0	0
				<hr/> Rs. 16,500 0 0		

## LIBRARY.

About 1,200 volumes have been added to the library during the year by purchase and presentation, most of which were on scientific subjects, About 500 volumes comprising some valuable Reports and Maps were received from the Government of Bombay.

Several valuable Persian and Sanskrit MSS. and lithographed Sanskrit works have been purchased for the Society at a cost of Rs. 515 and Rs. 1,233 have been laid out for Government in the purchase and copying of Sanskrit MSS. on account of the conservation of Sanskrit MSS.

The collection of Photographs has received some valuable additions during the course of the year including a series of 18 Photographs of the remains at Garhwa; another of 55 Photographs of paintings in the Ajunta, cave besides 11 Photographs, Lithographs, and Photozincographs on miscellaneous subjects, in all 84.

## PUBLICATIONS.

The Journal and Proceedings of the Society published during the year are well up to the standard, both in quantity and the value and interest of the contributions.

The Journal Part I. consists of upwards of 380 pages letter-press illustrated by 19 plates, and nearly 300 pages of Part II. have been published, illustrated by 14 plates. The Proceedings and Meteorological Observations. amount to 400 pages.

## OFFICERS.

Messrs. Blochmann and Wood-Mason have retained charge of Parts I and II. of the Journal, respectively, and of the other duties of their respective Secretaryships. The duties of General Secretary and editor of the Pro-

ceedings have been carried on by Captain Waterhouse during the year, with the exception of the months of October, November, and December, when Mr. Blochmann acted as General Secretary during his absence.

The Office of Treasurer and General Secretary has been held by Colonel J. E. Gastrell and, during his absence, by Captain J. Waterhouse and Mr. Blochmann.

#### BIBLIOTHECA INDICA.

The progress made in the publication of Oriental works in the Bibliotheca Indica has on the whole been satisfactory. The rapid issue of fasciculi during 1872 and 1873 necessitated a decrease for 1874, especially in the Persian Series. The issue, during those years, of indexes to several Historical works and the completion of several editions that had been commenced many years ago, absorbed the greater portion of the annual allowance for 1874, so that in the latter half of last year all printing had to be stopped. In 1875, the issue of fasciculi will proceed as usually. Notwithstanding the temporary stoppage during last year, there were published thirteen fasciculi, viz. four in the Persian, and 9 in the Sanskrit series. The four Persian fasciculi include two numbers (Nos. III. and IV.) of Major G. H. Raverty's translation of the *Ṭabaqāt i Nāqirī*; and among the Sanskrit numbers there is one fasciculus in Hindi.

Maulawī Zulfagār 'Alī edited two fasciculi (Nos. X and XI.) of the *Farhang i Rashīdī*; but as he left Calcutta in June last, the remaining portion of the work was entrusted to Maulawī 'Azīz urrahmán, of the Presidency College, who will complete the edition during the present year.

Owing to press of official and other work, Mr. Beames was obliged, the Council regret to state, temporarily to stop the printing of the first portion of Chand's poems, which he had undertaken. The second portion of the poems from Canto XXII. was taken in hand by the Rev. Dr. A. F. R. Hoernle, but soon after the publication of one fasciculus he was under the necessity of proceeding home. Dr. Hoernle is using his stay in Europe to collate several MSS. of Chand, and is expected to return to India in another year when he will resume his labours.

Of the works in the Sanskrit Series, the Chhanda Sutra has been completed. It is the oldest treatise extant on Sanskrit versification, and it has been very carefully edited and explained in elaborate foot notes by the editor. The other works are all in a forward state, and the Council expect that most of them will be completed in the course of the present year. Dr. Eggeling's edition of the Kātantra, which is being printed in England for the Society, is nearly ready for issue.

The funds available for the publication of Sanskrit works being already bespoken for the texts which are in hand, the Council has not thought fit to send to press the text of the *Bṛhaddevata*, to which reference was made in the last report. Its editor, Bābu Rājendralāla Mitra is, however, engaged in collating the six different MSS. which he has procured of the work, and it is expected that he will at an early opportunity send this old and important treatise on the Vedic gods to press.

The following is a detailed list of the works published—

*Persian Series.*

TABAQA'T NA'SIRI', by Minhāj i Sirāj. Translated into English by Major G. H. Raverty. Nos. III and IV.

FARHANG I RASHI'DI', by 'Abdurrahīd of Tattah. Edited by Maulawī Zulfaqār 'Alī. Nos. X and XI.

*Sanskrit Series.*

The Sāma Veda Sanhitā, with the commentary of Sāyanāchārya, edited by Satyavrata Sāmasrami, No. 301. Part II. Fasc. I.

The Kātantra, with the commentary of Durgasinha, edited with Notes and Indexes by Julius Eggeling, Nos. 297, 298. Fasc. I. II.

The Gobhiliya Grihya Sutra, with a commentary by the Editor, edited by Prof. Chandrakānta Tarkālakāra, No. 300, Fasc. V.

The Atharvana Upanishads with the commentary of Nārāyana, edited by Rāmamaya Tarkaratna, No. 305, Fasc. V.

The Agni Purāna, a system of Hindu Mythology and Tradition, edited by Rājendralāla Mitra, Nos. 306, 312, Fasc. V. VI.

The Chhanda Sutra of Pingala Achārya, with the commentary of Halāyudha, edited by Visvanātha Sastri, No. 307, Fasc. III.

*Hindī.*

The Prithirājā Rāsau of Chand Bardai, edited in the original old Hindi by the Rev. A. F. R. Hoernle, Ph. D., No. 304, Part II., Fasc. I.

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*List of Societies, Institutions, &c., with which exchanges of publications have been made during 1874.*

Batavia:—Société des Sciences des Nederlandes.

Berlin:—Royal Academy.

- Birmingham :—Institution of Mechanical Engineers.  
 Bombay :—Royal Asiatic Society.  
 „ Editor, Indian Antiquary.  
 Boston :—Natural History Society.  
 Bordeaux :—Bordeaux Academy.  
 Buenos Ayres :—Public Museum.  
 Bruxelles :—Académie Royale des Sciences.  
 Cherbourg :—Société Nationale des Sciences Naturelles.  
 California :—Academy of Arts and Sciences.  
 Calcutta :—Agricultural and Horticultural Society of India.  
 „ Geological Survey of India.  
 Christiania :—University.  
 Copenhagen :—Royal Society of Northern Antiquaries.  
 Cambridge :—University.  
 Dacca :—Editor, Bengal Times.  
 Dehra Dún :—Great Trigonometrical Survey.  
 Dublin :—Royal Irish Academy.  
 „ Natural History Society.  
 Edinburgh :—Royal Society.  
 Geneva :—Physical and Natural History Society.  
 Königsberg :—Physical and Economical Institution.  
 Lahore :—Agricultural Society of the Panjáb.  
 Leipzig :—German Oriental Society.  
 Liège :—Royal Society of Sciences.  
 Leyden :—Royal Herbarium.  
 Liverpool :—Literary and Philosophical Society.  
 London :—Royal Society.  
 „ British Museum.  
 „ Royal Asiatic Society of Great Britain and Ireland.  
 „ Royal Institution.  
 „ London Institution of Civil Engineers.  
 „ Royal Geographical Society.  
 „ Museum of Practical Geology.  
 „ Zoological Society.  
 „ Statistical Society.  
 „ Geological Society.  
 „ Linnean Society.  
 „ Editor, Athenæum.  
 „ Anthropological Society.  
 „ Editor, Nature.  
 „ Royal Astronomical Society.  
 „ Editor, Geographical Magazine.

- Lyon :—Agricultural Society.  
 Moscow :—Society of Naturalists.  
 Madras :—Government Central Museum.  
       "      Literary Society.  
 Manchester :—Literary and Philosophical Society.  
 Munich :—Royal Academy.  
 Netherlands :—Royal Society.  
 New Haven :—Connecticut Academy of Arts and Sciences.  
 Oxford :—Bodleian Library.  
 Paris :—Imperial Library.  
       "      Anthropological Society.  
       "      Asiatic Society.  
       "      Geographical Society.  
       "      Ethnological Society.  
 Stettin :—Entomological Society.  
 Stuttgart :—Natural History Society of Wurtemberg.  
 St. Petersburg :—Imperial Library.  
       "      Imperial Academy of Sciences.  
 Stockholm :—Royal Academy of Sciences.  
 Turin :—Academy.  
 Vienna :—Imperial Geological Institute.  
       "      Anthropological Society.  
       "      Zoological and Botanical Society.  
       "      Imperial Academy of Sciences.  
 Washington :—Smithsonian Institution.  
       "      Commissioners of the Department of Agriculture.

#### COIN CABINET.

The Coin Cabinet of the Society received during last year several valuable additions by purchase, *viz.* a unique gold coin of Husain Sháh of Bengal and a collection of twenty-five gold, silver and copper coins of Khoqand, Káshghar, and Eastern China.

On the motion of the President, the Report was adopted.

The Scrutineers reported the election of Officers and Members of Council for 1875, as follows :

The Hon'ble E. C. Bayley, C. S. I.

Bábu Rájendralála Mitra.

Col. H. Hyde, R. E.

Dr. T. Oldham.

*President.*

} *Vice-Presidents.*

H. Blochmann, Esq., M. A.

Captain J. Waterhouse.

J. Wood-Mason, Esq.

Dr. T. R. Lewis.

Col. J. E. Gastrell.

The Hon'ble E. C. Bayley, C. S. I.

Col. H. Hyde, R. E.

Babu Rajendralala Mitra.

Dr. T. Oldham.

Col. H. L. Thuillier, R. A., C. S. I.

Babu Prannath Pundit.

J. O'Kinealy, Esq.

L. Schwendler, Esq.

Dr. T. R. Lewis.

Dr. S. B. Partridge.

H. B. Medlicott, Esq.

Col. J. E. Gastrell.

H. Blochmann, Esq., M. A.

J. Wood-Mason, Esq.

Captain J. Waterhouse.

*Secretaries and Treasurer.*

*Members of Council.*

Messrs. Gay and Peterson were elected to audit the Annual Accounts for 1874.

The President then delivered the following address :—

### PRESIDENT'S ADDRESS.

After the report that has been just read to you, I have little to say beyond calling your attention to the Journal and to the work of the Editors during the past year.

On our Secretaries the work on this head has fallen very heavy and we owe them no small debt of gratitude for the hours of labour, (hours snatched as they must have been from that leisure so necessary to all of us), that they have bestowed on the Journal for the good of this Society.

Mr. Blochmann has so fully reported on Part I, that nothing is left for me to add; and I must turn then to Part 2nd.

The most extensive contributor to Part II of our Journal during the year under review has been Mr. Kurz, the Curator of the herbarium in the Botanic Gardens. He has given us the first part of his contributions towards our knowledge of the Burmese Flora, a work which when completed, will extend to about 800 or 900 pages of letter press, and he has described several new or imperfectly known Indian plants; Mr. Kurtz has also contributed to No. 4, which will be issued as soon as the index to the whole volume is ready, a monograph to date of Burmese Palms, illustrated by 20 plates, 12

\*of which have been reproduced in photozincography by the permission of the Surveyor General of India, and the remainder by lithography.

Dr. Dobson, whose departure from India was announced with regret at the last Annual Meeting, has continued his researches on Asiatic *Chiroptera*, describing several new forms and monographing the Asiatic species of *Molossi*; he has also recorded, in the Proceedings of the Zoological Society of London, a short but valuable series of experiments on the respiration of certain Indian freshwater fishers.

Ornithology has been by no means unrepresented: from Major Godwin-Austen we have received a most valuable contribution to our knowledge of the Avifauna of the Hill-tracts of our N. E. Frontier, illustrated by eight beautifully coloured lithographic plates, several of which have been drawn on the stone by the author himself who has further defrayed one half of their cost.

In Conchology, the favourite pursuit of our late able Secretary and the one in which he was excelled by no man, we have Dr. Stoliczka's descriptions of new species of *Alycæi* from those same hill ranges, our zoological knowledge of which he has done so much to extend, no less by his own writings than by his generous and thoughtful supplies of specimens to others; we also have Messrs. G. and H. Nevill's paper entitled descriptions of new marine Mollusca from the Indian Ocean, which is interesting and important if only as affording some indication of the extent to which our knowledge of marine zoology can be extended by the dredge. In connection with this, I venture to express the hope now that an Indian Coast Survey has been established, and all the necessary apparatus\* supplied by the Secretary of State that the Government will at an early date afford to the Society the long-promised opportunity of exploring the depths of the sea of Bengal, and further that the systematic collection of marine objects, from shore down to 100 fathoms line will be considered not inconsistent with the duty of one of the Officers (*e. g.* the medical officers) of that survey, as is the practice in the United States and other Coast Surveys. Finally, Mr. Wood-Mason has brought to notice his interesting discovery of a chain of superorbital bones in several species of an Indian genus of partridges, a series of bones the true homologue of which is to be sought for far down in the zoological scale, *viz.* amongst the Skink lizards and Blindworms. He has made out the generic identity of certain of the blind crustaceans discovered by the "Challenger" either the *Polychæles* of Heller and proposed for another the new generic title *Thaumastocheles*.

\* The experience gained by the "Challenger" in deep-sea dredging and by the Americans in deep-sea sounding, has removed many difficulties, and has simplified the operation much, ropes are being discarded for steel wire coiled into tanks of a solution of caustic soda: by using wire great depths are quickly reached and the solution perfectly preserves the wire from rust.

This part of the Journal has contained several other valuable papers, among others that on Duplex Telegraphy by Mr. Schwendler.

Turning to Physical Science, I would briefly notice the progress of those branches that have been before this Society and such proceeding as may be of interest.

*Duplex Telegraphy.*—During the past year all the difficulties that hitherto stood in the way of the practical application of Duplex Telegraphy have been overcome, the system has been introduced and is working on the Indian lines with perfect success.

The *double balance* method was introduced on the 28th June, on one of the main lines CALCUTTA—BOMBAY (1,600 miles,) since which date and during the worst season of the year (south-west Monsoon) this method has worked with great regularity and speed, and has carried nearly the whole of the traffic between the two Presidency towns.

In a few days another main line, BOMBAY—MADRAS, will be worked by this system, and it is probable that before the lapse of the current year, the whole of the main traffic in India, CALCUTTA—RANGOON included will be carried on this system.

Experiments made at Bombay in July, with the BOMBAY—ADEN cable (1,800 knots in length) have conclusively proved that Duplex working with the "*double balance*" method is also practicable on cables and it is to be hoped that the Companies concerned will soon avail themselves of it, with a view to increase the speed and reduce the charges.

It has been mathematically demonstrated and confirmed by practice that the "*double balance*" method fulfils all the necessary conditions to bring Duplex Telegraphy on a par with single Telegraphy.

This method not only allows the balancing in the one station to be effected without interfering with the balance of the distant station, but it ensures, that unavoidable variations in the resistance of the line shall have the least possible effect in disturbing that balance, and that all the other conditions such as maximum receiving currents, and the maximum magnetic effect of these currents shall be simultaneously fulfilled with it.

In addition to these great advantages an automatic system of adjusting the disturbed balance may be introduced, whence it follows that Duplex working must be entirely on a par with single Telegraphy, and that wherever single Telegraphy is possible, Duplex Telegraphy is equally practicable.

Thus one of the great standing problems in Telegraphy has been satisfactorily solved on the large main lines of India, and the practical solution of the second problem for long submarine cables, it is expected will soon follow.

The saving in outlay (capital) is very clear, for instance—at present there is only one wire between Calcutta and Rangoon. The increase of



traffic on this line has of late been so great that the question of putting up a second wire had to be considered.

The cost of this second line would have been about Rs. 4,00,000, but this expenditure will be avoided by the introduction of the Duplex arrangement, which will give equal capacity for traffic at a cost of about Rs. 4,000.

In addition to this, there are many technical advantages connected with the Duplex system of which it is necessary to mention the entire elimination of contacts and of the effects of Voltaic induction which is so much felt on long direct-worked circuits.

*Action of Light on the Electrical Resistance of Selenium.*—This is a most important discovery. It has been ascertained that the electrical resistance of crystalline selenium decreases considerably with the intensity of light shining on the selenium.

With a view to investigation on this head I have had an arrangement made for perfectly insulating a bar of selenium in a box, which can be opened and closed at pleasure from any distance of the observer, and Mr. Schwendler has already made some qualitative experiments with the apparatus verifying Lieut. Sale's and Earl Ross's experiments, *i. e.*, that the effect is due to *light* and not to conducted or radiated heat.

He found that the decrease of resistance of the pieces of selenium experimented with, is unmistakable, since it represents a variation up to 67 per cent. between darkness and the light of an ordinary kerosine lamp shining on it at a distance of about 13 inches.

It is our desire to find by careful experiments, to which the very perfect electrical apparatus at the Government Telegraph Store-yard is so eminently applicable, the law which connects the variations of resistance with the intensity of the light.

Mr. Schwendler expresses a belief that other similar substances, as for instance, sulphur in its two different states, would shew a similar effect, only, that it is more difficult to shew it, on account of the very small absolute conductivity sulphur possesses.

It is scarcely necessary for me to call your attention to the great future usefulness of this discovery (which is quite independent of its most interesting nature in revealing another co-relation of forces) I mean for the construction of a rational Photometer for which such a great want is felt and which does not at present exist.

In fact with this practical object in view, I secured the bar of selenium and constructed the apparatus mentioned.

*Unit of Electrical Resistance.*—Professor Kohlrausch has shewn that the British Association unit contains a probable error of about 2 per cent. and therefore, as the Siemens or mercury unit approaches the multiple absolute or Weber's unit, of which the British Association unit is to be a

representative, as closely as 3 per cent. Kohlrausch proposes that the Siemens unit should be introduced as the material standard for reference, especially as the Siemens unit is capable of such accurate reproduction, as has been shewn by different observers at different times, the error of reproduction of the Siemens unit exceeding scarcely half per mille. This material standard might then be expressed from time to time in absolute measure for scientific purposes. Its value would then be known more and more accurately in absolute measure in proportion as the methods of determination increase in accuracy, and by this proceeding endless confusion in future might be avoided.

Mr. Siemens when proposing his unit had foreseen most clearly all these difficulties connected with the production of a standard in absolute measure. Further his unit being so easily understood and having already attained such a wide extension in all electrical measurements. Professor Kohlrausch's proposals are very much to the point.

*Electromotographs.*—Another, and entirely new, discovery in Telegraphy has been made during the last year by Mr. T. A. Edison, of Newark.

The instrument is based on the newly discovered fact that when an electric current, even the weakest which would not be able to deflect even a very delicately suspended magnetic needle, passes through paper prepared in the ordinary manner as is used for the chemical telegraphs, the surface becomes changed, *i. e.*, where the current has passed, it becomes smooth, while in the other parts, where no current has passed, the paper keeps its original surface. This is the case, as already stated for the weakest possible currents, which would not even be able to produce coloration by electrolysis. Thus if a lever is introduced in the proper manner and is made to pass over these unreadable signals, the lever slides upon the paper, as upon ice when passing over a signal, but when no signal is under it, the lever is carried forward by the friction of the paper producing a certain motion of the lever which by the application of local batteries is made to reproduce the message in a readable manner.

It will be clear that no electro-magnets being used, the speed of receiving a message is only limited by the induction capacity of the line and by nothing else, and moreover the weakest possible currents being sufficient to produce this peculiar state of the paper, such a telegraph will work when all the present known ones would cease to function.

Mr. Edison finds that paper prepared with potassic hydrate is the best material for producing the required effect on the paper. This system in continuation with the now perfectly practicable Duplex working will raise the carrying capacity of the telegraph line to such an enormous extent that we may well expect to defer indefinitely the construction of new lines where old ones do already exist.

The result will obviously tend to lower the tariff to such rates as will hereafter enable telegraph communication to be used as a rule in many ordinary transactions, instead of as at present in exceptional cases only.

Mr. Schwendler informs me that he has the matter under close consideration, and hopes to be able during this year to lay before you his experimental results.

*Transit of Venus.*—From time to time the Society has been informed of the arrangements that were being made for observing the transit of Venus in this country. There has not been sufficient time to obtain the result, but I may note that Col. Tennant's party have been most successful, 107 six-inch Photographs and 5 Janssen plates have been taken, while in Calcutta 39 Photographs were taken.

*Zoological Garden Scheme.*—I regret to state that this question has not advanced during the past year.

The Committee appointed for the purpose resolved to adjourn the meetings until the calls on the Government for the present extraordinary expenditure were over.

In addition to this the difficulty of providing a suitable locality has acted as a check and since this no action has been taken.

I may, however, express again my opinion how desirable it would be to have an institution of the kind for the Capital of India, an institution which if put on a proper rational footing would be especially cherished both by the European and Native communities and which I trust will have the attention of both Imperial and Local Governments as an institution that will contribute largely towards education and the recreation of the public, and which can be very usefully connected with an acclimatising establishment of animals.

*Earth Currents.*—In my last annual report I mentioned this interesting question at some length. Action has been taken on Mr. Schwendler's suggestions and the Earth-current Committee assembled for the first time on the 2nd February, when it was resolved to draw up a detailed scheme based on the preliminary report of the Select Committee which was prepared in June last year.

This final scheme will then be laid before the Government of India for sanction.

The very great importance of a system of Earth-current measurements has been mentioned by Sir Wm. Thomson in his last annual address to the Society of Telegraph Engineers and has been also clearly indicated in a paper read before this Society in June last, from which it is most satisfactory to learn that we shall begin our work resting on a basis consisting of more than 10,000 quantitative measurements made all over India, Ceylon included, during a period of more than 7 years. These large number of observations wait only calculation and compilation.

I may here express my sincere wish that the Government of India may assist and that the machinery of the Government Telegraph Department may be employed to take the necessary observations with a view to the same being placed at the disposal of the Earth-current Committee, and the result published in the Society's Journal.

During the past year we have received the fourth volume of General Cunningham's Reports on the Archæological Survey of India and it fully maintains its character.

We have also received the first part of the new Marsden, which is mainly devoted to ancient weights and measures. It treats of ancient Indian weights and the actual value of the Tola is very ably and fully discussed.

Another book I have to mention is Bábu Rajendralála Mitra's first Volume of the Antiquities of Orissa. In 1868, the Government of India, at the suggestion of the Royal Society of Arts, assigned a large sum of money for the purpose of obtaining casts of some of the more important sculptures of ancient India. A part of this sum having been made over to the Government of Bengal, a number of Modellers and Photographers were sent to Orissa, and Bábu Rajendralála Mitra accompanied them as Archæologist. The book therefore, is the result of the Bábu's labours in connexion with this mission. It treats of the Orissa, Jain, and Bengal temples, and their architectural details, and contains a most interesting chapter on the state of civilisation of the people of ancient Orissa, deducible from their sculptures. The dress, ornaments, household furniture, carriages, arms, musical instruments, &c., of the ancient Uriahs are minutely described, depicted, and compared with the sculptures on other architectural remains, including those preserved in the Society's Museum. The book closes with a valuable dissertation on Buddhism, Sivaism and Vaishnavism, with special reference to Orissa Architecture. The work contains no less than thirty-six lithographs, and over fifty wood cuts, nearly all of which have been executed by students of the School of Arts, and though I have had only time to glance at the contents of the work, it having been issued this very evening, I have no doubt that it forms the most important addition to our knowledge of ancient Orissa, and fully maintains the reputation of its author. I sincerely hope that Bábu Rajendralála Mitra will soon bring out the second Volume, which is to contain a minute description of the antiquities of Khandagiri, Bhuvaneswar, Puri, Kenarak, Cuttack, Altí, Jájipur, and Balasore.

It only remains for me to announce the conclusion of the business of this Annual Meeting, and, thanking you for the support I have received for the past year, I have to resign the chair to our newly elected President.

The Meeting was then resolved into an ordinary Monthly General Meeting.

The Hon'ble E. C. Bayley, C. S. I., President, in the chair.

Mr. Bayley expressed his sense of the honour which the meeting had conferred on him in electing him as President of the Society. He thought he could make no better use of his position than by asking the meeting to express their thanks to the outgoing President and Council for the very able and unusual care which they had given to the affairs of this Society, a care to which the condition of the Society, its journals, and its finances bore testimony. He trusted that while he held the office of President, the same course of prosperity might attend the Society, and he further hoped that before it terminated they would be comfortably installed in their new quarters at the Indian Museum.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From Dr. J. F. N. Wise a silver coin of Islam Shah. A. H. 954.
2. A copy of Captain Pogson's Narrative of a Tour to Chattergaon.
3. From Dr. F. Jagor. A copy of "Reisen in den Phillippinen" and a copy of "Travels in Singapore, Malacca and Java."
4. A copy of "Microscopical notes regarding the Fungi present in Opium Blight," by D. D. Cunningham, M. B.—From the Author.
5. A Report of "Microscopical and Physiological researches into the nature of the agent or agents producing Cholera." By T. R. Lewis, M. B. and D. D. Cunningham, M. B.—From the Authors.
6. A copy of "The Pathological Significance of Nematode Hæmatozoa," by T. R. Lewis, M. B.—From the Author.

The following gentlemen duly proposed and seconded at the last meeting were elected ordinary members.

J. Armstrong, Esq., Surgeon, Bengal Army.

R. S. Whiteway, Esq., C. S., Moradabad.

J. Smidt, Esq., German Consul.

W. J. Porter, Esq., Arrakan.

The following are candidates for ballot at the next meeting.

Dr. T. Hendley, Civil Surgeon, Jeypore, proposed by Mr. Adam, seconded by Captain J. Waterhouse.

J. Douglas, Esq., Assistant Superintendent, Government Telegraph Department, proposed by Mr. Schwendler, seconded by Col. Hyde.

Walter Dodgson, Esq., Kalliganj, Rangpur, proposed by Mr. J. Wood-Mason, seconded by Mr. G. Nevill.

The Secretary reported that Major-General J. Y. Gowan, announced at the last meeting as withdrawing his name from the Society, has since expressed a desire to continue a member in Europe.

The following gentlemen have intimated their desire to withdraw from the Society.—

Col. O. Hamilton.

W. Heilgers, Esq.

S. C. Bayley, Esq.

Mr. Bayley laid before the Society a series of 36 photographs from the Sculptures discovered by General Cunningham at Barahut. These by no means represented the whole of the sculptures—but were specimens only of a few of the most interesting. The sculptures themselves were now, he hoped, on their way to Calcutta, as they had been liberally presented to the British Government by the Rajah of Nagode and his kinsman the Thakur of the place in which they were discovered.

There had already been notices of the general character of these sculptures; and descriptions of some of them, from General Cunningham's own pen, were before the Society. The sculptures were part of the decorations of an ancient "Stupa" and its appendages, and until General Cunningham commenced his researches had been practically lost. In fact the only trace of them was an inscription on one pillar which, mentioned by Col. R. Ellis, had drawn the attention of General Cunningham to the spot—on re-discovering the place he visited it, and seeing prospects of success in digging proceeded to disentomb these sculptures which were entirely covered with earth.

The value of the resulting discovery had been gladly acknowledged by men of the highest learning in Europe, as might be seen by the Numbers of the Academy which he had before him, and which were accessible to the members of the Society.

The present collection included certain representations of various occasions in the life of Buddha or belonging to the stages of his existence anterior to his last appearance as Sakya Muni—particularly there was a curious representation of the purchase of the ground for the Jelavana monastery; there were certain figures of Nagas and Yakshis, male and female, connected with Buddha's history, and sundry other sculptures, particularly a series of "bodhis" or sacred trees—from which it would appear that various kinds of trees were sacred to the various Buddhist saints.

Professor Minayeff of St. Petersburg, whom he would take the liberty of introducing to the Society, would explain to them that this was in exact accordance with the statements of an ancient Buddhist MS. purchased by him in Ceylon and that the attribution of each tree in the sculptures agreed with the enumeration given in the MS. in question.

The following papers were read:—

1. *On a Copper-plate Inscription of the time of Skanda Gupta.* By BA'BU RA'JENDRALÁLA MITRA.

The plate has been found at Indor, a small village near Anopshahar on the Ganges. It records an order of one Devavishnu, a petty zemindar of the place, directing the guild of oil-sellers of Indrapur to supply daily a sufficient quantity of oil for the use of the temple of the sun at that place, the supply being increased by two ounces and three drachms on every new-moon day. The order was issued in the month of Phálguṇa of the year 146, during the reign of Skanda Gupta. This date is at variance with the generally received interpretation of the Kuhlón pillar inscription, according to which Skanda Gupta had died before 141 year of the same era; but the author of the paper contends that that interpretation is wrong, and shows at length that the word which implies "extinction" in that record, does not apply to the kingdom, or to the king, but to the year on the expiry of which the occurrence mentioned took place. He is of opinion also that the era used in the several Gupta inscriptions which have come to light is the Sákā, and not the Samvat nor the Ballabhi era.

Mr. Bayley observed that the Society were indebted to the learned Bábu for his lucid explanation of the phrase containing the date of this inscription, which he believed was in accordance with a tentative reading already made by General Cunningham and which had been assented to by several pandits. It was to say the least on the face of it a more probable rendering of the phrase than that which had hitherto been commonly accepted. For himself also he perfectly agreed in the attribution of the Gupta dates to the Saka era. This suggestion too had been anticipated by General Cunningham\* in his remark at the 4th page the 3rd of Vol. of the *Archæological report*, and if this was so, he thought it was quite possible to give a complete interpretation to the account of the Arabic historian quoted by the Bábu. According to that passage while the Gupta era dated from the era of their destruction it was shown also to be exactly the same as the Balabhi era, dating from the establishment of the Balabhi dynasty, it seemed probable that Gupta and Balabhi were really merely two differing names for the same era given according as it was viewed as dating from one event or the other, which were in fact concurrents. The fall of the Guptas being produced by the success of the Balabhi kings. It was not a wholly unprecedented fact that an era should be dated from the destruction of a dynasty, for we know that the Saka era took its date from the victory in which a Saka invader was slain, and the successes of his followers were checked finally, or at any rate for a long series of years.

\* And it may be fair to say that this era was suggested as possibly identical with the Gupta era by Mr. Thomas in Prinsep's *Essays*, Vol. I, p. 276.

But while going so far with the Bábu, he must wholly demur to his conclusion that the Kanishka dates belonged to the same epoch, and were part of the same series of dates. No doubt there was a Kanishka date of the 9th Sambat, and no doubt also one of Chandra Gupta of the 93rd year, but it was palpably impossible that they should belong to the same series of dates, for with the Mathura and other inscriptions we had now a clear series of dates of Kanishka and his successors Havishko and Vasu Deva (the Boz Deo of the Indo-Scythians) the dates of the latter coming as low as Sambat 96.

Now we had Chandra Gupta's date of 93 and these two dates would overlap, and there would be not only this difficulty, but supposing the Sanda inscription with this date to be that of Chandra Gupta the first, there would yet be no place for the two kings who we know preceded Chandra Gupta I, viz., Sri Gupta and Ghatot Kacha. There was nothing however, to show that this inscription really belongs to Chandra Gupta the first. Indeed General Cunningham on apparently good grounds assigned it to Chandra Gupta the second,\* in which case no less than four previous kings would have to be provided with a place in the series!!

Mr. Bayley stated that his own belief was, that the dates of the Kanishka dynasty referred to an earlier era, which he believed to be the Vikramaditya era, he had some time since come to this conclusion from his own enquiries, without being aware that General Cunningham had anticipated him, though he differed from the learned General in believing that this era took its rise from the occasion of Kanishka himself and not from that of Volumokadpheses as General Cunningham held.

He thought it was probable, as he understood was General Cunningham's belief also, that the Guptas first superseded the Indian branch of the Indo-Scythian invaders; those who came down to the eastward and were in consequence involved in a contest with the Western branch of the Indo-Scythians situated as we know from many authorities in the Western Punjab and Scind, and that the great victory from which the Saka era took its rise was one in which the leader of the Western Indo-Scythians† was defeated and slain by one of the Gupta kings possibly either Ghalot Kacha or Chandra Gupta the 1st. The latter certainly adopted the title of Vikramaditya, while on a coin of the former he was described as the conqueror of the "Ansu"‡ at least as Professor Hall reads the somewhat doubtful legend. In either case, if the Vikramaditya era answer to the Kanishka era Sri Gupta would

\* As a matter of fact, General Cunningham assigns a Gupta inscription at Gárhwa in the Allahabad district not without some grounds dated in 86 to Chandra Gupta II.

† I doubt if any of the Guptas or at least the early kings of that dynasty ever established their rule in any part of the Panjab or even in the northern extremity of the Doab.

‡ Anenz Asii? cf. C. Arch. Reports, Vol. II, p. 43.



have to be placed between 96 of that era, in which year Vasu Deva was also reigning, and the commencement of the Saka era, that is A.D. between 39 A.D. and 78 A.D. and if Cunningham's attribution of the Garhwa inscription dated in 86 to Chandra Gupta the second be correct, there would be about 86 years for the five next kings viz., Ghatot Kacha, Chandra Gupta I, Samudra Gupta and 60 years from 86 to 146 the date of the Eran inscription for Chandra Gupta II. Kumara and Skanda Gupta, or 146 years for six kings or an average of over 25 years each. This is no doubt a somewhat long but by no means impossible average, though no doubt it indicates a period also of comparative freedom from internal discord, a period of peace and prosperity, as indeed from the comparatively numerous coins and inscriptions of the Gupta Dynasty seemed very probable. In fact save for a short period in the middle of the first century A.D. India would seem to have enjoyed comparative tranquillity from 57 B.C. to towards the end of the first quarter of the 3rd century.

Bābu Rājendralāla Mitra said, that as he had not entered into the subject of the Kanishka dates in his paper and had only referred to them casually in his verbal remarks, it was not necessary for him to discuss it at length. He thought, however, that the question of the era of Kanishka's records was still an open one. In all the inscriptions of that sovereign, the era is indicated by the syllable *ꣳ*, which may be an abbreviation of the *Samvat* of Vikramāditya, or of *Samvatsara*, the Sanskrit for a year, and there was therefore ample room for discussion. Extraneous evidence might or might not be forthcoming to settle the doubt, but the fact of the earlier dates of the Indo-Scythians falling in with the later ones of the Guptas was a remarkable one and needed careful enquiry. The earliest known date of Chandra Gupta was 87, the latest of Kanishka 47, the earliest 9. One of the Mathura inscriptions gives 44 for the date of Vasudeva, so he cannot be called a successor of Kanishka. There were two predecessors of Chandra Gupta of the Gupta line, and it was questionable whether the period of their united reigns would just fill in the gap between the known dates of Kanishka and Chandra Gupta. But it was quite immaterial whether it did so or not, as the Indo-Scythians reigned in a very different part of the country from where the Guptas exercised their power. It had been said that the fact of Ghatotkacha calling himself a destroyer of Asuras implied that he came after the overthrow of the last successor of Kanishka; but the assumption was not tenable, as the founder of the *Samvat* era also called himself a destroyer of the S'akas, and he lived before Kanishka flourished in India. Bābu Rājendralāla Mitra did not, however, wish to press the question, as he did not think that sufficient materials were at hand to come to a satisfactory conclusion.

2. *Postscript to description of Phaenicopterus Andersoni.* By W. E. Brooks, Esq., C. E.

In continuation of my paper on an undescribed species of *Phaenicopterus* I have received a communication from Mr. Anderson recording the capture of immature examples of *P. antiquorum*, Temm.=*P. roseus*, Pall.; and these immature birds most fully confirm the separation of *P. Andersoni* as a distinct species.

Mr. Anderson says, "I am glad to tell you of the capture of two female *Phaenicopterus roseus* in the juvenile dress, corresponding in age to the immature specimens of *P. Andersoni*. There can be no further doubt as to the distinctness of the two birds, as we have them now, young and old; both having the same characteristics.

"The two young birds just got, measure 38 in. and 39 in., with wings of 14.5, and 15 in. One of them has the entire wing black, no rosy hue at all to speak of, and yet the *primary* coverts are *light pink*, broadly tipped with *black brown*. In *P. Andersoni* these are *white*, tipped only *brown*, even in the old birds. You will remember too, that the male and female of this latter measure 50 and 44 in.

"I should like you to see these interesting specimens. (*P. roseus* *juv.* W. E. B.)

"I think *P. roseus* is a commoner bird than *P. Andersoni*."

The very different size, the distinct coloration, and the distinguishing characteristics being common both to old and young of the two species referred to, entirely forbid the supposition of their identity. The two birds have hitherto been confounded by most naturalists, just as the very distinct Eagles, *Aq. Mogilnik* and *Aq. bifasciata*, formerly were; which no one now would dream of uniting.

*Mogulserai*, 18th January, 1875.

## LIBRARY.

The following additions have been made to the Library since the meeting held in January last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXII. No. 155.

*J. Y. Buchanan*—On the absorption of Carbonic acid by Saline solutions. *R. Mallet*.—On the mechanism of Stromboli.

## THE ROYAL SOCIETY OF LONDON.

The Quarterly Journal of the Geological Society, Vol. XXX, part 4, No. 120.

*J. F. Campbell*—On Polar Glaciation, &c. *Rev. T. H. Bonney*—On the Upper Engadine and the Italian valleys of Monte Rosa, and their relation to the Glacier-erosion Theory of Lake Basins. *T. Bell*—On the Steppes of Siberia.

## THE GEOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society, General Index to Vols. XXVI—XXXV.

## THE STATISTICAL SOCIETY OF LONDON.

Journal of the Chemical Society, Vol. XII. Augt., Sept. and October, 1874.

*Augt., H. Adrian*—Dendritic spots in paper. *September, E. Neison*—On the products of the decomposition of Castor oil No. III. On the decomposition by excess of Alkaline Hydrate. *W. Smith*—Aniline and its homologues in Coal-tar oils. *W. Smith*—On the action of Chlorine, Bromine, &c., on Isodinaphthyl. *October, H. E. Roscoe*—On a new Chloride of Uranium. *E. C. C. Stanford*.—On the action of earth on organic Nitrogen.

## THE CHEMICAL SOCIETY OF LONDON.

Proceedings of the Royal Institution of Great Britain, Vol. VII, part IV, No. 61.

*W. Spottiswoode*—On the combinations of colour by Polarized light. *Professor W. K. Clifford*—On the Education of the people. *Profr. B. Sanderson*—On Venus' Fly-trap (*Dionaea muscipula*).

## THE ROYAL INSTITUTION OF GREAT BRITAIN.

The Journal of the Linnean Society, Vol. XII. Zoology, No. 57, and Vol. XIV. Botany, Nos. 73 76.

*Vol. XII. Zoology, No. 57. F. P. Pascoe*—Contributions towards a knowledge of the Curculionidæ.

*Vol. XIV. Botany, No. 73. C. B. Clarke*—On a new genus in the order Hydrocharidaceæ. *Rev. M. J. Berkeley*—Enumeration of the Fungi of Ceylon.

*No. 74. Rev. M. J. Berkeley*—Enumeration of the Fungi of Ceylon.

*No. 75. J. E. Howard*—On the Genus Cinchona.

*No. 76. J. G. Baker*—Revision of the Genera and Species of Tulipææ.

The Transactions of the Linnean Society of London, Vol. XXVIII, part

4. Vol. XXX, part 1.

*Vol. XXVIII, part 4.* *Profr. Oliver*—On *Begoniella*, a new genus of *Begoniaceæ*. *Profr. Oliver*—Descriptions of three new genera of plants in the Malayan Herbarium of the late Dr. A. C. Maingay. *Rev. O. P. Cambridge*—On new and rare British Spiders.

*Vol. XXX, part 1.* *J. Scott*—Notes on the Tree Ferns of British Sikkim with Descriptions of three new species and a few supplemental remarks on their relations to Palms and Cycads. *F. W. O. Rymer Jones*—On some recent forms of *Lagenæ* from Deep-sea Soundings in the Java Seas. *Profr. H. G. Reichenbach*—Enumeration of the Orchids collected by the Rev. E. C. Parish in the neighbourhood of Moulmein, with Descriptions of the New species.

THE LINNEAN SOCIETY OF LONDON.

Proceedings of the Royal Irish Academy, Ser II, Vol. I, Nos 7-10.

No. 7. *S. Fergusson*—On some links in the chain of connexion between the early populations of Asia and Central America.

No. 9. *M. Donovan*—Description of a comparable Hygrometer which registers the Maximum and Minimum of Siccity and Humidity of the Atmosphere in the absence of an observer; with observations on its employment. *A. Macalister*—The Muscular Anatomy of the Gorilla.

The Transactions of the Royal Irish Academy, Vol. XXV, parts 4-9.

Part 5. *J. C. Malet*—Some Theorems in the Reduction of Hyper-elliptic Integrals.

Part 6. *R. S. Ball*—Screw-Co-ordinates and their applications to Problems in the Dynamics of a Rigid body.

Part 9. *W. R. McNab*—Experiments on the movements of Water in Plants (part I).

THE ROYAL IRISH ACADEMY OF DUBLIN.

Minutes of the Proceedings of the Institution of Civil Engineers, Vols. XX-XVII, XXVIII.

*Vol. XXXVII.* *J. Robinson*—On modern Locomotives designed with a view to Economy, Durability and Facility of Repair, together with some particulars of the duty performed and of the Art of repairs.

*Vol. XXXVIII.* *P. Neville*—On the Water-supply in the city of Dublin. *Major J. Browne*—On the Tracing and Construction of Roads in Mountainous Tropical countries. *J. McC. Meadows*—Peat Fuel Machinery.

THE INSTITUTION OF CIVIL ENGINEERS, LONDON.

Journal Asiatique, Tome IV., Nos. 5, 6.

No. 6. *M. Constantin de Skatsschhoff*—Le Vénitien Marco-Polo et les services qu'il a rendus en faisant connaître l'Asie.

THE ASIATIC SOCIETY OF PARIS.

Bulletins de la Société D'Anthropologie de Paris, Tome IX, fas 2.

*P. Broca*—Sur les doctrines de la diplogénèse. *Bertillon*—Des Combinaisons de sexe dans les grossesses gémellaires (doubles ou triples), de leur cause et de leur caractère ethnique.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Mémoires Couronnés et Mémoires des Savants Etrangers, Tomes XXXI,—XXXIV, XXXVII.

Mémoires de L'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Vols. XXXIV,—XXXVII, XL.

Mémoires Couronnés et Autres Mémoires, Tomes XV—XXII.

Bulletins de L'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Tomes XIX—XXIV, XXXV, XXXVI.

Annuaire de L'Académie Royale des Sciences des Lettres et des Beaux-Arts de Belgique, 1865—1868, 1874.

THE ROYAL BELGIAN ACADEMY OF SCIENCES AND ARTS.

Mémoires de la Société de Physique et D' Histoire Naturelle de Genève, Tomes IX—XX, XXII, XXIII, parts I and II.

THE PHYSICAL AND NATURAL HISTORY SOCIETY OF GENEVA.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Band XXVIII, Heft 2, 3.

E. Windisch—Hemachandra's Yogasāstra. A. Weber—Zum Saptacatakam des Hala.

THE GERMAN ORIENTAL SOCIETY OF LEIPSIG.

Abhandlungen der Königlich Akademie der Wissenschaften zu Berlin, 1873.

THE ROYAL ACADEMY OF SCIENCES OF BERLIN.

Abhandlungen der Historischen classe der Königlich Bayerischen Akademie der Wissenschaften, Band XII, Abthg. 2.

Sitzungsberichte der Königlich Bayerischen Akademie der Wissenschaften, 1873, Math-Natur classe Heft 3.

Philos-Histor....Heft 4-6.

1874, Math-Natur classe Heft 1.

Philos-Histor....Heft 1-2.

THE ROYAL BAVARIAN ACADEMY OF SCIENCES, MUNICH.

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften.

Math-Natur classe Bd. LXVI, Erste Abthg. Heft 1—5

Zweite 1—5

Dritte 1—5

Bd. LXVII, Erste Abthg. Heft 1—5

Zweite 1—3

Philos-Histor classe Bd. LXXII, Heft 1—3

Bd. LXXIII, Heft 1—3

Archiv für Österreichische Geschichte, Bd. XLVIII, Hälfte 2, XLIX, Hälfte 1-2, L. Hälfte 1.

Fontes Rerum Austriacarum—Österreichische Geschichte-Quellen, Bd. XXXVII. Zweite Abthg.

Almanach der Kaiserlichen Akademie der Wissenschaften, 1873.

Atlas der Hautkrankheiten, Text von Professor Dr. F. Hebra, Bilder von Dr. A. Elfinger und Dr. C. Heitzmann, Liefg. VIII.

THE IMPERIAL ACADEMY OF SCIENCES OF VIENNA.

Jahrbuch der Kaiserlich—Königlichen Geologischen Reichsanstalt, Bd. XXIV, No. 2.

Über die Triadischen Pelecypoden-Gattungen *Daonella* und *Halobia* von Dr. E. M. von Mojsvár—Über die Palaeozoischen Gebilde *Podolius* und deren Versteinerungen, von Dr. A. von Alth.

THE IMPERIAL GEOLOGICAL INSTITUTE OF VIENNA.

Tabulae Codicum Manuscriptorum praeter Graecos et Orientales in Bibliotheca Palatina Vindobonensi Asservatorum, Vol. VI.

THE CAESARIAN ACADEMY.

Bulletin de la Société Impériale des Naturalistes de Moscou, 1874, No. 1.

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

J. Diplomi Greci ed Arabi di Sicilia, pubblicati nel Testo Originale Tradotti ed Illustrati da Salvatore Cusa, Vol. I, parte 1.

THE PALERMO UNIVERSITY.

Proceedings of the American Academy of Arts and Sciences, Vol. IX.

THE AMERICAN ACADEMY OF ARTS AND SCIENCES.

Monthly Reports of the Department of Agriculture for 1873.

THE DEPARTMENT OF AGRICULTURE, WASHINGTON, U. S. A.

Reisen in den Philippinen, von F. Jagor. Singapore—Malacca, Java, Reiseskizzen von F. Jagor.

THE AUTHOR.

Untersuchungen über die Härte an Krystallflächen, von Dr. F. Exner.

THE AUTHOR.

Culturgeschichte in ihrer Natürlichen Entwicklung bis zur Gegenwart, von F. von Hellwald, Liefg. 10-11.

THE AUTHOR.

The Pathological Significance of Nematode Hæmatozoa, by T. R. Lewis, M. B.

THE AUTHOR.

Microscopical Notes regarding the Fungi present in Opium Blight, by D. D. Cunningham, M. B.

THE AUTHOR.

A Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera (2nd series), by T. R. Lewis, M. B., and D. D. Cunningham, M. B.

THE AUTHORS.

Sutta Nipáta or Dialogues and Discourses of Gotama Buddha, by Sir M. Coomára Swamy.

THE AUTHOR.

Origin of the Durga Puja, by Pratápachandra Ghosha.

THE AUTHOR.

The Christian Spectator, Vol. IV, Nos. 43-44.

THE EDITOR.

Captain Pogson's Narrative during a tour to Chittagong, 1831.

DR. J. WISE.

Meteorological observations made at the Magnetic and Meteorological observatory at Simla, during 1841-1845.

THE GOVERNMENT OF INDIA.

Annual Report of the Civil Dispensaries for 1872.

THE GOVERNMENT OF MADRAS.

Statistical Descriptive and Historical Account of the N. W. P. of India, by E. T. Atkinson, Vol. I, Bundelkhund.

Selections from the Records of Government, Vol. VI.

THE GOVERNMENT, N. W. PROVINCES.

Grammatical Notes and Vocabulary of the Peguan Language, by Rev. J. M. Haswell.

THE CHIEF COMMISSIONER OF BRITISH BURMA.

### *Purchases.*

Comptes Rendus, Nos. 14-17.

No. 14. *M. P. Lagrange* propose l'emploi du poly sulfure de baryum.—*M. le Ministre des Affaires Etrangères* transmet quelques détails Complémentaires au sujet de la récente éruption de l' Etna. *M. E. Mercadier*—E'lectro-diapason á période variable. *M. M. B. Delachanal et A. Mermet*—Tube spectro-électrique destiné á l'observation des spectres des solutions métalliques. *M. G. Tissandier*—Observations Météorologiques en ballon. *M. W. de Fonvielle*—Note sur des observations spectroscopiques faites dans l'ascension du 24 Septembre 1874, pour étudier les variations d'étendue des couleurs du spectre.

No. 15. *M. A. Leroy et M. Granjon* adressent des Notes sur la navigation aérienne. *M. G. Tardani* adresse un Memoire relatif au Cholera.

No. 16. *P. Secchi*—Observation de l' éclipse solaire du 10 Octobre 1874, avec le spectroscopé. Tableaux des observations des protubérances solaires, du 26 Décembre 1873 ou 2 août 1874. *M. N. Lacoudret* adresse une Note relative á la direction des ballons. *M. C. Jordan*—Généralisation du théorème d'Euler sur la courbure des surfaces. *M. M. C. Paquetin et L. Jolly*—La matière Colorante du sang (hématosine) ne contient pas de fer.

No. 17. *M. Th. Du Moncel*.—Huitième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. A. Léard* adresse un Mémoire sur un appareil de télégraphie optique, de jour et de nuit, á l' usage des armées encampagne.

Journal des savants, Octobre 1874.

Revue et Magasin de Zoologie, 1874, Nos. 7-9.

Revue Archéologique, Oct., Nov. 1874.

Octobre, Nov., *M. G. Conestable*—De L' Inhumation et de L' Incinération chez les Etrusques.

Revue des Deux Mondes, 15 Oct.—1st Nov. 1874.

1st Nov., *M. P. Janet*—La Science Sociale et la Philosophie Anglaise.

The Quarterly Review, 1874, October.

The Edinburgh Review, 1874, October.

The Ibis, Vol. IV, No. 16.

*H. E. Dresser and W. T. Blanford*—Notes on the specimens in the Berlin Museum collected by Hemprich and Ehrenberg. *A. R. Wallace*—On the arrangement of Families constituting the Order Passeres. *P. L. Sclater*—Dr. A. B. Meyer's Ornithological Discoveries in New Guinea. *H. E. Dresser*—On a new species of Marsh-Warbler. *R. Swinhoe*—Ornithological Notes made at Chefoo (Province of Shangtung, North China). Obituary Notice of Dr. Stoliczka.

The American Journal of Science, Vol. VIII, No. 46.

The London, Dublin, and Edinburgh Philosophical Magazine, Nos. 319, 320.

No. 319. *Sir. W. Thomson*—On the perturbations of the Compass produced by the rolling of the ship. *A. M. Mayer*—Researches in Acoustics, No. V.

No. 320. *A. M. Mayer*—Researches in Acoustics No. V.

The Annals and Magazine of Natural History, Nos. 83-84.

No. 83. *Professor Allman*—Notes on the structure and development of Myriothela phrygia. *H. J. Carter*—Development of the Marine sponges from the earliest recognizable appearance of the Ovum to the perfected individual. *Dr. A. Günther*—Description of a remarkable kind of Air-bladder. *Dr. J. E. Gray*—List of the species of Feline Animals. *W. C. Hewitson*—A list of Butterflies with descriptions of new species from the Andaman Islands. *J. Scott*—On a collection of Hemiptera Heteroptera from Japan. Descriptions of various new Genera and Species. *A. G. Butler*—Descriptions of new species of *Sesia* in the collection of the British Museum. *Dr. A. Günther*—Descriptions of new species of Fishes in the British Museum. *R. B. Sharpe*—Description of a remarkable new Pheasant from Borneo. *Dr. J. E. Gray*—On the colour of the Kittens of the Species of Cats. *M. A. Giard*—On the Ethology of *Sacculina carcini*.

No. 84. *H. J. Carter*—Development of the Marine Sponges from the earliest recognizable appearance of the Ovum to the perfected individual. *W. T. Blanford*—Description of a new *Helix* from Southern India. *J. Scott*—On a collection of Hemiptera Heteroptera from Japan. Descriptions of various new Genera and species. *Dr. A. Günther*—Descriptions of new species of Fishes in the British Museum. *E. R. Lankester*—Note on the *Planula* or *Gastrula*-phase of Development in Mollusca. *W. T. Blanford*—Note on *Ablepharus pusillus*.

Journal of the Society of Arts, XXII, Nos. 1143-1150.

The Numismatic Chronicle, 1874, part 3.

Conchologia Iconica, parts 318-319.

Solecurtus, Petricola, Physa, Astarte, Venerupis and Pandora.

The Calcutta Review, 1875, January.

*G. R. C. Williams*—Historical sketches, part I. The Sikhs in the Upper Doab. The Royal Asiatic Society. Ritual and Ritualism. *G. W. Cline*—The Portuguese in Western India.



## Stray Feathers, Vol. III, Nos. 1, 2, 3.

A first list of the Birds of Upper Pegu. *V. Ball*—Notes on some birds observed in the Suliman Hills. *W. V. Legge*—Additions to the Avifauna of Ceylon and Notes on various species found there. *J. Gammie*—On the breeding of *Aceros nipalensis*. *J. Aitken*—The Swallows and Swifts of Berar. *The late Dr. F. Stoliczka*—The Avifauna of Kashgar in Winter. *W. V. Legge*—On *Dromas ardeola*. *W. E. Brooks*—Notes upon a collection of birds made between Mussoori and Gangotri. What is a species? Notes on *Arborophila mandellii*, *Locustella lanceolata* and *subsignata*, *Brachyurus megarhynchus* found in the delta of the Irrawaddy during summer, *Munia pectoralis*, Books and papers received, Nestlings of *Palæornis fasciatus*, *Cuculus micropterus* in the Andamans. Letters to the Editor. *V. Legge*—*Tringa albescens* in Ceylon and on the West Coast of Australia. *J. Gammie*—On eggs of *Leiothrix callipyga*. *M. F. Coussmaker*—*Rhynchrea bengalensis* breeding in December. *F. Wise*—*Pterocles coronatus* in southern Sindh. *J. C. Parker*—*Cursorius coromandelicus* found in Lower Bengal. *F. R. Blewitt*—*Pterocles alchata* found in the Gurgaon District.

## The Indian Antiquary, for January 1875, part 38.

*Professor C. H. Tawney*—Metrical translation of the Nitisatakam of Bhartrihari. *Captain J. S. F. Mackenzie*—Tree and Serpent worship. *H. Blochmann*—Persian Inscriptions from Belgam, Samppgam, Gulbarga, and Siddhapur. *Colonel H. Yule*—Malifattan. *Rev. E. T. Cole*—Santhali Folklore. *M. J. Walhouse*—Archæological Notes. *G. H. Damant*—Notes on Hindu Chronograms. *Rev. F. Kittel*—Old Kanarese Literature. The God Vihobá of Pandarpur. On the Catholics of Western India. Agaris.

## The Indian Annals of Medical Science, No. 33.

*Exchange.*

The Athenæum, October 1874.

Nature, Nos. 266-269.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MARCH, 1875,

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The monthly General Meeting of the Asiatic Society was held on Wednesday the 3rd instant at 2 o'clock P. M.

Bábu Rájendralála Mitra, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:

1 A Catechism in Romanised Bengali printed in 1734. From H. Beveridge, Esq., C. S.

The following letter accompanied the donation:

I herewith send you the book I spoke about. The title page is missing but the certificate at the beginning tends to show that the book was composed at all events at Bhawal (in the Dacca District) in 1734.

The Catechist also says at the beginning that he lives in Bawal or Bhawal in the place called Nagori and which is still the seat of a church.

The book was given to me by Mr. Santa Maria the priest at Silpur in Backergunge. The Asiatic Society is welcome to the volume if it wishes to keep it.

Mr. Blochmann said, the book was of great interest as a first attempt at transliterating Bengali into European languages.

2. A copy of Record of Meteorological observations kept at St. Xavier's College during 1874. From Fr. Lafont.

3. One Cross-bow and one Gown used by the Khying people, Sandoway. From Major G. E. Fryer.

4. An engraved gem worn as a charm and 14 Muhammadan coins; 2 Bactrian, 1 Hindu (all silver) and 1 copper coin. From Col. F. W. Stubbs, Lucknow.

Mr. Blochmann said—The eighteen coins presented by Col. Stubbs consist of 2 silver Bactrian coins (one a cast of a Sophytes with the cock) ; 2 Hindu coins, one a silver Kanauj coin, the other copper ; 2 silver coins of Sháhrúkh Bahádúr, dated 528 and 837 A. H. ; 2 silver coins of Abul Ghází Sultán Husain Mírzá Bahádúr, one struck at Astrábád, and the other at Hárát in 898 A. H. ; 2 silver coins of Alá-uddin Abul Muzaffar Muhammad Sháh, of Dihli, of 710 and 714 A. H. ; 1 Jahángiri rupee, struck at A'grah in the 10th year ; 1 A'lamgir rupee, of the 1st year ; one small modern silver coin struck by Sayyid Muhammad Khudáyár, the Khán of Khoqand ;\* and 5 small illegible silver coins, of which 2 belong to Kábul.

5. A MS. copy of Ayodhyá Máhátmya. From Babu Ram Narain, 3rd master, Bareilly College.

The following gentlemen duly proposed and seconded at the last meeting were ballotted for and elected ordinary members.

Dr. F. Hendley, Civil Surgeon, Jeypore.

J. Douglas, Esq. Assistant Superintendent Government Telegraph Department.

Walter Dodgson, Esq., Kallygunge, Rungpore.

The following are candidates for ballot at the next meeting.

Major Lord Ralph Kerr, Mathura, proposed, by Mr. F. S. Growse, seconded by Capt. J. Waterhouse.

Capt. E. N. D. La Touche, Assistant Commissioner Samaguting, Assam, proposed by Capt. J. Waterhouse, seconded by Mr. H. Blochmann.

Dr. A. J. Wall, Bengal Medical Service, proposed by Dr. Waller, seconded by Dr. T. Oldham.

Mr. H. M. Durand of Bhagalpur has intimated his desire to withdraw from the Society.

The President reported that the Council have nominated Dr. S. B. Partridge as a Trustee of the Indian Museum on behalf of the Society.

The Secretary read the following letter from the Revd. E. Lafont on the subject of the erection of a Spectroscopic Observatory at St. Xavier's College.

DEAR SIR,—I propose to erect a Spectroscopic Observatory at St. Xavier's College, where daily observations and mapping of the solar protuberances will be made. As this undertaking is entirely for the benefit of Science, I venture to request the assistance of the Society, in the shape of subscriptions towards the fund for the building and instruments necessary for the intended Observatory. I have every reason to believe that the Government of Bengal will subsidise my scheme if I realise a sufficient sum by private subscriptions.

\* Khoqand (generally called Khokan on European maps) is always called on coins "Khoqand i latif," 'the pleasant Khoqand.'

Will you be so kind as to place my present request before the Council of the Society for consideration and have it also notified to those Members who may feel disposed to contribute to this eminently useful work.

I may mention that a rough estimate of the outlay, fixes the lowest limit at Rs. 10,000, of which one half at least is to be covered by private contributions.

I have the honour to be,

Dear Sir,

Your most obedient servant,

E. LAFONT,

*Rector St. Xavier's College.*

*Calcutta, February, 9th 1875.*

The President reported on the part of the Council that they recommended a grant of Rs. 500 be given to Father Lafont towards the expense of setting up the proposed Observatory.

The motion was put to the vote and unanimously carried.

Father Lafont said—

It is, I think, useless to dwell on the importance of the spectroscopic study of the Sun, but it may be necessary to explain before you, how I came to what may look a rather ambitious undertaking, being a mere tyro in a department of science so novel and difficult as that of the physical constitution of the Sun. The very names of those who went before me, might have frightened me out of the way; Lockyer, Huggins, Secchi and Qacchini are great men and it is somewhat presumptuous on my part to attempt even to follow them. Had it not been for the pressing invitation of my friend Professor P. Tacchini I would never have dreamt of establishing a Spectroscopic Observatory with the very scanty knowledge of Astronomy I possess. But when the eminent founder of the Italian Spectroscopic Society reassured me and explained to me that the work was more that of a physicist than of an astronomer I confess I yielded with pleasure and promised to do every thing in my power to carry out his views. I received encouragement from all to whom I communicated my plans, and His Honor the Lieutenant-Governor having promised his assistance, a subscription was opened, and I am happy to say is now more than half filled. I hope to receive the encouragement of this Society and with the help of those members who would have been better qualified than myself for the work, I am confident to realise the sanguine expectations of the patrons of my scheme. I may be permitted to say that the stability of the Observatory is guaranteed by the conditions communicated in the Bengal Government order for the grant-in-aid, conditions proposed by me in order to satisfy every one as to my earnestness of purpose. In conclusion, gentlemen, I beg to state

that when the Instruments are ready for use, any member of the Society willing to take observations, shall be welcome to the St. Xavier's Observatory.

The Secretary said—that it was proposed that the results of Father Lafont's daily observations should be published, by means of photozincography, in the Society's Journal or Proceedings in a style similar to those published by the Italian Spectroscopic Society of which specimens were on the table, and would add greatly to the interest and value of the Journal.

The President reported that Dr. T. R. Lewis has agreed to take up the duties of General Secretary during the temporary absence of Captain J. Waterhouse, with the Eclipse Expedition.

The Secretary announced that information had been received that the Geographical Congress of Paris has been postponed to 1st August next.

The Secretary reported that the Council have recommended the following gentlemen to serve on the several Committees during the current year.

#### FINANCE.

Bábu Rájendralála Mitra.  
L. Schwendler Esq.  
Dr. S. B. Partridge.  
J. Geoghegan, Esq.  
Col. H. Hyde, R. E.  
Dr. T. Oldham.

#### LIBRARY.

The Honorable J. B. Phear.  
Bábu Rájendralála Mitra.  
Col. H. Hyde, R. E.  
G. Nevill, Esq.  
A. Pedler, Esq.  
Dr. Mahendralál Sircar.  
L. Schwendler, Esq.  
J. Geoghegan, Esq.  
W. S. Atkinson, Esq.  
Dr. S. B. Partridge.  
C. H. Tawney, Esq.  
Whitely Stokes, Esq.  
G. W. Barclay, Esq.  
W. G. Willson, Esq.  
Dr. D. D. Cunningham.  
W. S. Brough, Esq.  
Dr. W. Waagen.

## PHILOLOGY.

Bábu Rájendralála Mitra.  
C. H. Tawney, Esq.  
Major-General A. Cunningham.  
J. Beames, Esq.  
F. S. Growse, Esq.  
Rev. K. M. Bannerjea.  
Bábu Gaurdása Basák.  
Dr. Mahendralál Sircar.  
Moulavi Abdool Latiff Khan Bahadur.  
Moulavi Kubiruddin Ahmed Sahib.  
Babu Dvijendranátha Thakura.  
Whitely Stokes, Esq.  
Bábu Pránnath Pandit.

## NATURAL HISTORY.

Dr. J. Ewart.  
W. S. Atkinson, Esq.  
L. Schwendler, Esq.  
G. Nevill, Esq.  
H. F. Blanford, Esq.  
V. Ball, Esq.  
H. B. Medlicott, Esq.  
D. Waldie, Esq.  
A. O. Hume, Esq.  
Dr. W. Waagen.  
Dr. J. Armstrong.  
S. Kurz, Esq.  
Dr. G. King.  
S. E. Peal, Esq.  
W. E. Brooks, Esq., C. E.  
Dr. S. B. Partridge.  
Dr. W. Schlich.  
W. Theobald, Esq.  
R. Lydekker, Esq.

## PHYSICAL SCIENCE.

His Excellency Lord Napier of Magdala.

Col. H. L. Thuillier, C. S. I.  
H. B. Medlicott, Esq.  
H. F. Blanford, Esq.  
D. Waldie, Esq.  
L. Schwendler, Esq.

A Pedler, Esq.  
 R. S. Brough, Esq.  
 D. D. Cunningham, Esq., M. B.  
 The Hon'ble J. B. Phear.  
 A. Tween, Esq.  
 W. Theobald, Esq.  
 W. G. Willson, Esq., B. A.  
 A. Cappel, Esq.  
 Dr. S. B. Partridge.  
 Col. H. Hyde, R. E.  
 Dr. T. Oldham.  
 V. Ball, Esq.  
 Col. D. G. Robinson.  
 Rev. F. Lafont.  
 J. O'Kinealy, Esq.

## COINS.

Col. H. Hyde, R. E.  
 Bábu Rájendralála Mitra.  
 Major-General A. Cunningham.  
 Col. F. W. Stubbs.  
 Rev. M. A. Sherring.

## COMMITTEE OF PAPERS.

The Members of Council.

The following letter was read :

From Captain R. Beavan, Assistant Superintendent of Survey, Bann District, Panjab, enclosing a drawing of a stone with an inscription on it found by him last year in the Chanda district, Central Provinces.

DEAR SIR,—I have the pleasure to enclose a drawing of a stone with an inscription on it, which I found last year in the Chanda district, Central Provinces. I do not know whether it is of any interest, or what the language of the inscription may be, but I have no doubt you will have no difficulty in getting it deciphered. I shall be happy to give any further information regarding it should it turn out to be of any interest.

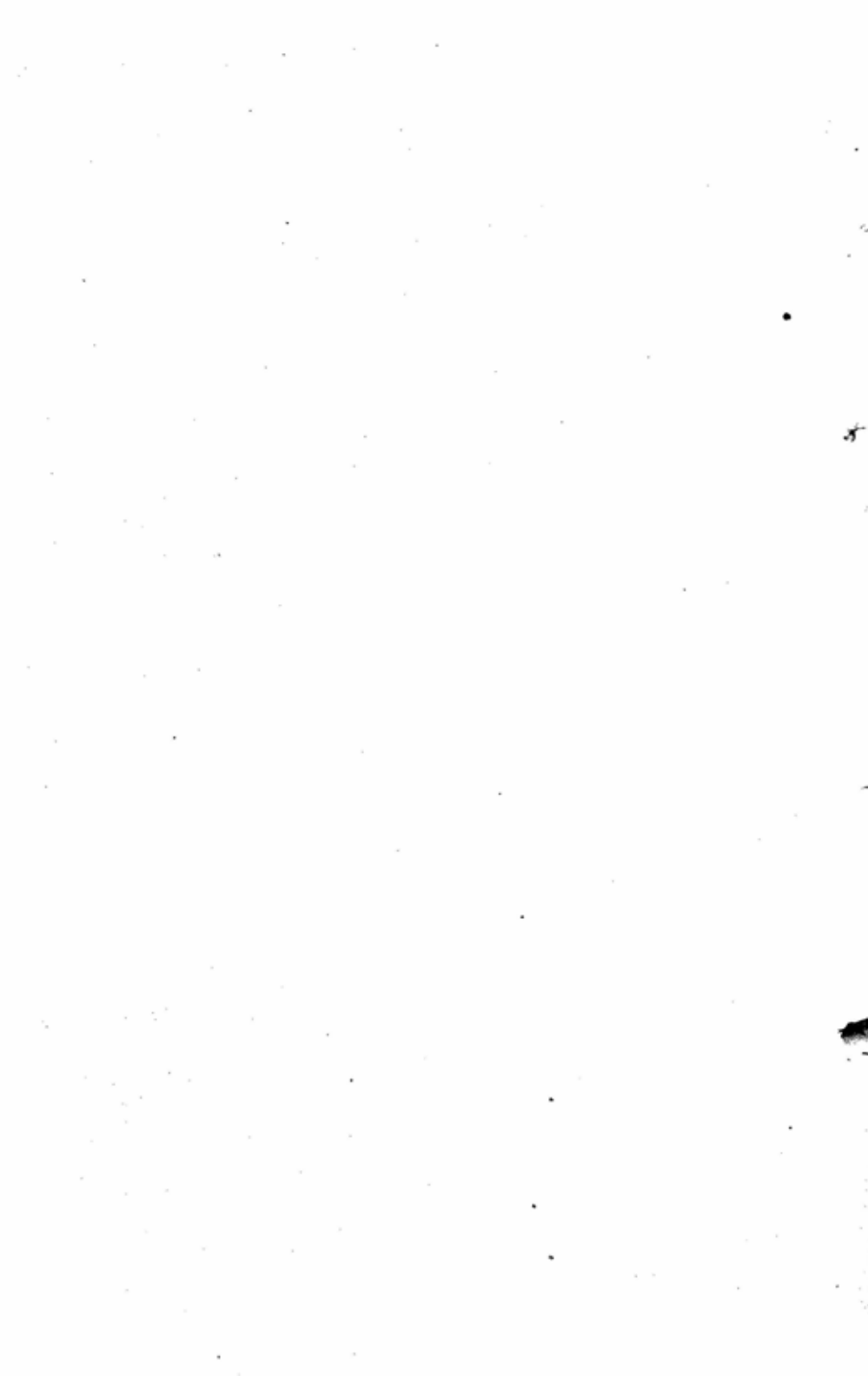
The President said—Captain Beavan's inscription is interesting as giving a very old character of the first century B. C., but it is imperfect, containing only the last letter of a long record. I read the letters *ढ वा च ध ङा ध ख न* but cannot make out the meaning. The second is in modern character and may be read *सगपद्मजोगी*. The hermit (yogi) son of Magapanna 700. The pious man giving the name of his father instead of his own, he having become a hermit not wishing to parade his own good deed in dedicating the temple, by publishing his name. The figures indicate the date.

The following papers were read :





STONE NEAR TOORSA VILLAGE, AHERI ZEMINDARI, DISTRICT CHANDA.



2. *Note on the Alti Hills, Cuttack.*—By J. BEAMES, Esq., C. S.

Babu Rajendralala Mitra then read the following report on the Researches carried on by him for collecting information regarding Sanskrit MSS. in native Libraries.

*From Bábu R'AJENDRALA'LA MITRA,*

*To Captain J. WATERHOUSE, B. S. C.,*

*Secretary to the Asiatic Society of Bengal.*

*Dated Maniktollah, Calcutta, 15th February, 1875.*

SIR,—I have the honor to submit the following report on the operations carried on by me to the close of 1874 for collecting information regarding Sanskrit manuscripts in native libraries.

*Objects of the enquiry.*—2. Under the orders of Government my attention has been steadily directed—1st, to enquire and collect information regarding rare and valuable manuscripts; 2nd, to compile lists thereof; 3rd, to print all procurable unprinted lists of such codices with brief notices of their contents; 4th, to purchase, or secure copies of, such of them as are rare or otherwise desirable.

*Enquiry for MSS. Places visited.*—3. The work under the first head has been mainly conducted by a Pandit who has been deputed to the Mufassil to visit the different private Toles, or Sanskrit colleges, and private gentlemen who are reputed to possess collections of Sanskrit MSS., and I have been out on several occasions to help him. I have also been to Benares on three occasions to enquire for and purchase MSS. The places visited by the Pandit include the districts of Dacca, Nuddia, Burdwan, Hoogly, and 24-Pargunnahs. The large collections of Rájá Jotindramohan Tagore, of the late Sir Rájá Rádhákánta Deb, of the late Bábu Rámcomal Sen, of the late Rájá Pitámbar Mitra, of Babu Subaldása Mallik, and of others in Calcutta have also been examined. In Dacca Pandits are the only owners of MSS., no private gentleman having anything like a large collection, and the few works they have, being mostly such as have already been printed. In Nuddia the library of the Rájá of Krishnanagar contains the largest number of Tantras, but at the time when my Pandit visited it, the MSS. were kept in a very neglected state, and most of them were found to be defective. In Burdwan there are not many Toles, but Babu Hitalála Misra of Manakara has a very choice collection of works, including a great number of very rare treatises on the Vedánta. In Hoogly, the Serampore College has a small but valuable collection of MSS. procured principally by the late Dr. Carey, and there are also a few Toles owning MSS. In the 24-Pargunnahs, several zemindars have good collections of the Tantras and the Púrapas, and the numerous Toles on the left bank of the river Hoogly and at Harinábhi and elsewhere contain many old and rare works of which very little is known to European Orientalists. There are no *Maths* (monas-

teries) in any of the districts named which contain a collection of Sanskrit works: not even the Maṭh attached to the great temple of Tárakes'vara in the Hoogly district is noted for its literary treasures. The case is, however, different in Rájsháhi, Mymensing, Pabnah, Tirhoot, and Orissa, where some of the Maṭhs own large collections of great age and considerable value.

*Substance of MSS. Paper.*—4. The manuscripts examined have mostly been written on country paper sized with yellow arsenic and an emulsion of tamarind seeds, and then polished by rubbing with a conch-shell. A few are on white Kás'miri paper, and some on palm-leaf. White arsenic is rarely used for the size, but I have seen a few codices sized with it, the mucilage employed in such cases being acacia gum. The surface of ordinary country paper being rough, a thick coating of size is necessary for easy writing, and the tamarind-seed emulsion affords this admirably. The paper used for ordinary writing is sized with rice gruel; but such paper attracts damp and vermin of all kinds, and that great pest of literature, "the silver-fish," thrives luxuriantly on it. The object of the arsenic is to keep off this insect, and it serves the purpose most effectually. No insect or worm of any kind will attack arsenicised paper, and so far the MSS. are perfectly secure against its ravages. The superior appearance and cheapness of European paper has of late induced many persons to use it instead of the country arsenicised paper in writing puthis; but this is a great mistake, as the latter is not near so durable as the former, and is liable to be rapidly destroyed by insects. I cannot better illustrate this than by referring to some of the MSS. in the Library of the Asiatic Society. There are among them several volumes written on foolscap paper, which dates from 1820 to 1830, and they already look decayed, mouldering, and touched in several places by silver-fish. Others on John-letter paper, which is thicker, larger and stouter are already so far injured that the ink has quite faded, and become in many places illegible; whereas the MSS. which were originally copied on arsenicated paper for the College of Fort William in the first decade of this century are now quite as fresh as they were when first written. I have seen many MSS. in private collections which are much older, and still quite as fresh. This fact would suggest the propriety of Government records in Mofussil Courts being written on arsenicised paper instead of the ordinary English foolscap, which is so rapidly destroyed both by the climate and also by white-ants. To guard against mistakes, I should add here that the ordinary yellow paper sold in the bazars is dyed with turmeric, and not at all proof against the attack of insects.

*History of paper.*—5. It is well known that originally the Hindus used leaves of trees for writing upon, whence the name of letters in Sanskrit has become *patra*, and latterly newspapers have been designated by the same name. The oldest manuscript on paper I have seen is a copy of the

Bhágavata Puráṇa now in the possession of Bábu Harischandra of Benares. It bears date, Samvat, 1367=A. C. 1310, and is consequently 565 years old. Its paper is of a very good quality, and judging from it, it is to be inferred that the people of the country must have, at the time when it was written, attained considerable proficiency in paper-making. Long before that time, in the reign of Bhoja Rájá of Dhárá, a work was written on letter-writing (the *Prasasti-prakás'iká*, and in it detailed directions are given for folding the material of letters, for leaving a large space on the left side of such letters as margin, for cutting a portion of the left lower corner, for decorating the front with gold leaf, for writing the word *S'rí* a number of times on the back &c., &c., all which apply to paper, and cannot possibly be practicable on palm-leaf, and the inference therefore becomes inevitable that paper was then well-known and in general use, though the word used to indicate it was *patra*, probably very much in the same way as paper of the present day owes its name to papyrus. Again a verse occurs in the *Saṁhitá* of Vyása, which must be at least two thousand years old, in which it is said "that the first draft of a document should be written on a wooden tablet, or on the ground, and after correction of what is redundant and supplying what is defective, it should be engrossed on *patra*," and it would be absurd to suppose that *patra* here means leaf, for leaves were so cheap that it would have been a folly to save them by writing on wooden tablets which were much more costly. How long before the time of this verse paper was known, I have no positive evidence to show, but the frequent mention in the old Smritis of legal documents (*lekhyá*), of their attestation by witnesses, of their validity, &c., suggests the idea of there having been extant, in olden times, some material more substantial and convenient than palm-leaf for writing, and knowing that paper was first manufactured by the Chinese long before the commencement of the Christian era, that the famous charta bombycina of Europe was imported from the East, and that block-printing was extensively practised in Tibet in the fourth century, I am disposed to believe that the Hindus must have known the art of paper-making from a very early date. Whether they originated it, or got it from the Chinese through the Tibetans, or the Kás'miris, who have been noted for their proficiency in the art of making paper and papier-maché ware, is a question which must await further research for solution. *A priori* it may be argued that those who manipulated cotton so successfully as to convert it into the finest fabric known to man, would find no difficulty in manufacturing paper out of it.

*Palm-leaf*.—6. The palm-leaf referred to above is not now much in use, except in Orissa and in the Mufassil vernacular schools as a substitute for slates. In Bengal the Chaṇḍi is the only work which is now-a-days written on palm-leaf, as there is a prejudice against formal reading of that

work from paper MSS.—a prejudice in many respects similar to what obtained in Europe against printed Bibles in the first century after the introduction of printing. Formerly two kinds of palm-leaf were in use, one formed of the thick strong-fibred leaflets of the *Corypha taliera* (*tiret*), and the other of the *Borassus flabelliformis* (*tálapátá*). The former is generally preferred for writing Sanskrit works, as it is broader and more durable than the latter, and many MSS. are still extant which reckon their ages by five to six hundred years. The leaflets of the *Corypha elata* is sometimes used in lieu of those of the *taliera*. The leaflets of all the three kinds of palms are first dried; then boiled or kept steeped in water for some time; then dried again; cut into the required size; and polished with a smooth stone, or a conch-shell. For school use no such preparation is necessary.

*Bark.*—7. The practice of writing on bark is of the greatest antiquity, and from constant use the Greek and the Latin terms for that substance—*biblos* and *liber*—have long since become the names for books, even as the name of the rolls of ancient parchment MSS. produced the term *volume*, and codes of laws have received their generic name from the bundles of boards on which they were written,—from *codex* a tablet of wood. In the eastern districts this practice of writing on bark still prevails, and I have seen several codices of bark, which formed thin sheets like veneer, eighteen inches by four; but I have not been able to ascertain from what species of tree the article had been obtained. Some say that the tree called *ugra* (*Morunga hyperanthera*) yields the best bark for writing upon, but I have not seen it. The birch bark, Bhurjapatra (*Betula bhurja*) is extensively used as a material for writing upon, but only for amulets, it being too thin and fragile for books. I have by me a piece of this bark about a hundred years old, which on a space of ten inches by eight, contains the whole of the Bhagvadgítá, written with letters so small that they are illegible to the naked eye and require a magnifying glass to be read. It was evidently intended to be worn as an amulet enclosed in a locket of gold or copper, but it had never been so used. Whether the bhurj bark was ever pasted or glued into thick sheets I cannot say.

*Wood, metal and skin.*—8. In the S'ástras tablets of wood and metal have been recommended as materials for writing upon, and in former times, copper-plates were usually employed for royal patents, and in Burmah they are still occasionally used for writing large works; but I have seen none now used by the Pandits of Bengal. Wooden tablets are confined to petty traders' account-books in Bengal, but in the North Western Provinces poor people have some religious books written with chalk on blackened boards. In the Lalita Vistara, or legendary life of Buddha, mention is made of Sandal-wood boards which were handed to S'ákya when he first commenced to write. In Europe, parchment and dressed skins of goats have been from

time immemorial used as materials for books, and for durability they stand unrivalled; but I have never seen mention in Indian works of parchment or dressed skin of any kind as material for writing; and palimpsests are of course unknown.

*Pens.*—9. According to the Yogini Tantra, bamboo twigs and bronze styles are unfortunate, and gold and reeds are the best for pens; but the universal practice among the Pandits of Bengal is to use the bamboo twig for pens, and only rich householders employ the *vrinnala* or *khákrá* reed. In the North Western Provinces, the reed or calamus, whence the Indian word *kalama*, is generally used, and bamboo pens are all but unknown. The latter, however, when well-prepared is much more elastic and durable, and it has the further and supreme advantage of being every where procurable without any cost. Crow-quills were formerly used for writing very small characters for amulets, but never for ordinary manuscripts. In Orissa, where letters are scratched and not written on palm-leaves, an iron style with a pointed end and a flat top every where replaces the bamboo twig and the calamus reed.

*Ordinary ink.*—10. The ink used for writing puthis is of two kinds; one fit for paper and the other for palm-leaves. The former is made by mixing a coffee-coloured infusion of roasted rice with lampblack, and then adding to it a little sugar, and sometimes the juice of a plant called *kesurte* (*Verbesina scandens*). The labour of making this ink is great, for it requires several days' continued trituration in a mortar before the lampblack can be thoroughly mixed with the rice infusion, and want of sufficient trituration causes the lampblack to settle down in a paste, leaving the infusion on top unfit for writing with. Occasionally acacia gum is added to give a gloss to the ink, but this practice is not common, sugar being held sufficient for the purpose. Of late an infusion of the emblick myrobolan prepared in an iron pot has occasionally been added to the ink, but the tannate and gallate of iron formed in the course of preparing this infusion are injurious to the texture of paper, and Persian MSS., sometimes written with such ink, suffer much from the chemical action of the metallic salts.

The ink for palm-leaf consists of the juice of the *kesurte* mixed with a decoction of *áltá*. It is highly esteemed, as it sinks into the substance of the leaf, and cannot be washed off. Both the inks are very lasting, and, being perfectly free from mineral substances and strong acids, do not in any way injure the substance of the paper or leaf on which it is applied. They never fade, and retain their gloss for centuries.

*Coloured ink.*—11. To mark the ends of chapters and for writing rubrics, colophons and important words on paper, an ink made of cinnabar, or *áltá*, is sometimes used, and in correcting errors the usual practice is to apply on the wrong letters a colour made of yellow or red orpiment ground

in gum-water, and when it is dry to write over it. Omissions of entire words and sentences of course cannot be rectified in this way, and they have therefore to be supplied by writing on the margin. Interlineation is generally avoided; but in old MSS. which have been read and revised by several generations, they are not altogether wanting. In commentaries, the quotations from texts are generally smeared over with a little red ochre, which produce the same effect which red letters in European MSS. were intended to subserve, and whence the term rubric got into currency. These peculiarities, however, are more prominent in the MSS. of the North Western Provinces than in those of Bengal, and in palm-leaf codices they are generally wanting, except in Burmah where some sacred Páli works are written with a thick black varnish on palm-leaves throughout richly gilt and wrought over with scrolls and other ornaments. Ordinary Burmese MSS. have the edges of the leaves painted and sometimes gilt.

*Illustrations.*—12. Illustrations are almost unknown in Bengal; but in Orissa they are frequently employed. The most noted place, however, for illustrations is Kás'mir, and the finest and richest MSS. are usually produced in that province, the illuminations consisting of flowery initials, grotesque cyphers, single figures, historical compositions, marginal lines, and scroll borders; most of the illustrations are in the Moorish style.

*Size &c. of Paper MSS.*—13. The size of paper MSS. varies from eight to twenty inches, by four to eight inches. The paper is folded so as to mark the margins and regulate the straightness of the lines. In the North Western Provinces, the paper is sometimes so folded as to retain two leaves together, but in Bengal it is always cut into separate and distinct folia. Sometimes a board mounted with strong thread tied at equal distances is used for a ruler. The paper is laid flat on this board, and then pressed hard with a ball of cloth whereby it receives an impression of the threads on its surface, and these impressions look very like water-lines. The leaves are written over lengthwise, leaving a uniform margin all round. The words are generally, but not always, separated by small spaces, and for punctuation the upright stroke or *dánda* is freely used. No breaks are made to indicate the ends of paragraphs or sections, and should the writing at the end of a work terminate in the middle of a line, the line is filled up by writing the letter *sri*, or stars, or the name of some god several times until the line is completed, so that all the lines may be of uniform length. In the case of codices which contain both a text and a commentary, the text is written in large letters on the middle, and the commentary above and below it in smaller letters. This arrangement is called the *trivalli* form, and some tact is necessary in engrossing such writing, so that all the commentary on the given text may be comprised on the same page. The copyist's name is frequently given at the end, and also the date in S'aka or Samvat, rarely in



Jupiter's cycles. The name of the place where the copy is made and that of the party for whom it is made are also occasionally given, but never the name of the reigning sovereign. A protestation sometimes occurs at the end, saying that the copyist has faithfully followed his text and is not responsible for errors.

*Size &c. of palm-leaf MSS.*—14. Palm-leaf MSS. are from the nature of the material narrower and longer, and they are never ruled or folded, the veins of the leaf serving the purpose of ruling. A square space is usually left blank in the middle of the page, and in the centre of it a round hole is punched for a string to pass through, for the purpose of tying the codex in a bundle. Very long MSS. have two such spaces and holes. The Tantras enjoin that the holes should always be punched, never cut with a knife, or produced by burning. The reason for this rule is obvious, as cutting or burning produces a hole with jagged sides which are very apt to catch the string and cause a split in the leaf. A clean-punched hole allows the string to slide freely, and produces no injury. In Bengal some very old paper codices have the square blank space in the middle, but none has any hole bored in it. In the North Western Provinces the blank space does not occur, and both in Bengal and the North West the leaves are piled in a bundle between two boards, and then tied round in a piece of coarse cloth. Where the codices are small, with a view to economy, several of them are usually tied in one bundle, and this causes much trouble in finding out any particular work when needed. For boards the spatha of the betel-nut tree, which yields a thick, coreaceous, pliant substance, is often substituted in the eastern districts, and they are found to be very useful, as they are not liable to warp, crack, or be attacked by insects.

*Mode of preserving MSS.*—15. In the houses of rich men a dry masonry room is generally assigned to MSS. where a sufficient number of shelves or chests are provided for the storage of the codices. But care is not always taken to open the bundles every now and then, and to expose them to the sun for a few hours. In pukká monasteries, the same mode of preservation is also adopted, and there being always some monk or other who can read, and who takes a delight in reading, the bundles are more frequently opened, aired and dried. The Jains are very particular in this respect, and in their monasteries great care is usually taken of their literary treasures. The case is, however, very different as regards the Toles of Bengal. The men who own them are, with rare exceptions, very poor; they live in low, damp, thatched huts of the meanest description; they have no means of buying proper cabinets for their manuscripts; and their time is so occupied by their professorial duties, and frequent perigrinations to distant places for earning the means of their livelihood, that they cannot often look after their books. The receptacle they usually

assign to their MSS. is a bamboo frame placed across the beams of their huts, exposed constantly to the damp emanating from the daily-washed mud floors of their rooms, and occasionally to leakage from ill-made and old thatched roofs, while mice and other vermin have full and free access to them at all times. The mice are particularly destructive, as they not only gnaw cloth, boards and palm-leaves, but by their liquid discharges, rapidly destroy the texture of arsenicised paper. The fact was first brought to my notice by a mukhtear when I was a boy. He asked my permission to put two sheets of fresh-looking, written, stamped paper for a night on the bottom of a cage of white mice which were my pets. The permission was granted, and the next morning the papers were taken out, stained and decayed very like old documents, which they were, I then learnt, intended to pass for. I was also told and shown that by careful and repeated washing with a mixture of the fluid discharge of mice with water, paper can be made to assume the appearance of any age that may be desired : the effect produced is not confined to the surface, but is perceptible even in the texture of the paper.

*Copyists and Copying.*—16. Even as in mediæval Europe monks were the principal copyists of ancient works, so were their congeners, the principal preservers of Sanskrit literature in India during the last ten or fifteen hundred years. Yatis, Saunyásis, Gossains, and their disciples congregated in large Maths, devoted all their leisure hours, the former in composing and the latter in copying, and the monasteries benefited largely by their labours. In the Toles the pupils were, and still are, the principal copyists. In return for the board, lodging and education they receive, free of all charge, from their tutors, they copy all such works as their tutors require, and thus the Toles are enriched. For the public, however, the principal copyists are the Káyasthas. Old and used-up men of this caste, when no longer fit to earn their livelihood by active exertion, generally betake to copying ancient works for householders and private gentlemen, and the bulk of the MSS. now extant is due to their labours. Poor Bráhmans also betake to this occupation. Seated on their haunches, with the paper, or palm-leaf, resting on their raised knees, which serve for a table, and the pen and ink procured from materials everywhere available, they ply their vocation without making any outlay, or subjecting themselves to any exertion which would be unsuited to their habits and time of life. The remuneration they formerly derived ranged from one rupee to two rupees eight annas per thousand s'lokas of thirty-two thousand letters, according to the quality of writing. The rates have now been doubled, owing principally to the demand for copyists being limited, and very few betaking to the profession. As a class, these copyists are men of limited literary knowledge ; but generally speaking, they are faithful to their duty, and reproduce the originals placed before them with fair accuracy.

*Authenticity of MSS.*—17. They rarely attempt to correct the errors and mistakes of the originals, and to exonerate themselves from all charge of tampering the originals, they not unoften put a verse at the end of their works, saying, "As he has seen, so has he copied, and the copyist should not be blamed for mistakes." Clerical errors they are certainly liable to, and do commit, but such errors are not numerous. One serious mistake they, however, sometimes commit,—it is that of copying in the body of the text, notes and parallel or remarkable passages which often occur on the margins of old and frequently-read codices, and these consequently appear as parts of the texts in their works, and subsequent copying from their codices perpetuates the interpolation. This is, however, done through ignorance, and not through any wicked motive. Of fabrications and forgeries, the Māhātmyas and local legends afford ready instances; but they are due to Pandits, and not to copyists. Corrections made by Pandits when reading are necessarily perpetuated by copyists, and to them is principally due the numerous *varæ lectiones* which are to be met with in Sanskrit writings. This evil has been of late greatly multiplied by incompetent editors, who print texts from solitary MSS., and replace doubtful readings and fill up lacunæ by imaginary emendations. With a few praiseworthy exceptions, the publications of the Bengali and Benares presses belong to this class, and they are much less trustworthy than even corrupt MSS. The plasticity of the Sanskrit language admits of even obviously incorrect readings being explained somehow, and the authenticity of the originals is thereby irretrievably ruined. The errors of MSS. may be corrected by collation, for though there are many faulty MSS. I have every reason to doubt that there are many falsified texts, but the fabrications in printed books issued by thousands cannot be readily detected and exposed.

With so many causes at work to injure the authenticity of ancient Sanskrit works, and at a time when European Orientalists are so busily employed in tracing interpolations and corruptions which have already taken place, it would be futile to attempt in a report like this, an enquiry at length how far the charge may be sustained; but this much may be said that the MSS. now extant do not show any sign of dishonest fabrications; codices from three to four hundred years old, existing in different parts of India, in Bengal, Madras, Bombay and Kás'mir, are so closely similar in their readings, that they produce no suspicion in the mind of their having been tampered with. What happened before that time, it is not necessary for me to guess; suffice it to say, in the language of Isaac Taylor, that "the habitudes of Eastern nations undergo so little change in the lapse of ages that, probably, these descriptions of things as they are now, would differ little from a similarly graphic account of the same operations, dated a thousand years back. Where the arts of life remain in their rude state, all those operations which depend upon them; continue nearly the same."

*Age of MSS.*—18. The oldest palm-leaf manuscript I have seen bears date Samvat 1189 = A. C. 1132, and the oldest paper manuscript as aforesaid is Samvat 1367 = A. C. 1810 ; but such records are exceedingly rare, and the general run is from 150 to 250\* years. Among old MSS. taken to Europe, Dr. Weber, in his invaluable catalogue of the Berlin collection, notices several codices ranging from 4 to 6 hundred years. Seeing that charta bombycina has lasted in Europe for eight to twelve hundred years, this age for works which claim to be from two thousand to three thousand five hundred years old, is very unsatisfactory ; but the climate of Bengal and the manner of keeping MSS. here, as above described, are highly unfavourable to their preservation for a long time, not to advert to the wholesale destruction of MSS. in large Maths, and richly endowed temples which must have resulted from the ravages of those whose co-religionists burnt the Alexandrine library. Indeed it is not remarkable that old MSS. are so rare, but that notwithstanding such potent influences constantly at work, there should still exist in the country so many and such old MSS. as have been from time to time met with. A new influence is now at work for the destruction of MSS. The halo of sanctity which formerly surrounded Sanskrit literature is fast fading away ; the ancient Hindu religion is gradually losing its hold on men's minds ; Sanskrit is no longer a paying study ; European literature is rapidly replacing it everywhere ; the venerable old pandits—the repositories of traditional and book knowledge of ages,—whose erudition was the profoundest, to whom no modern scholar, European or Asiatic, can for a moment be compared, and who have hitherto preserved with such unflinching zeal the oldest literary monuments of the Aryan race, are rapidly dying out, and their places are not being supplied by the rising generation. For hundreds who formerly studied Sanskrit we have not scores ; and, there being little demand, very few new MSS. are being prepared to take the place of those which are crumbling down by age. Many works of great literary value and age have already disappeared, and others are in eminent risk, and, unless timely saved, will in half a century more be irreparably lost.

*Accessibility of MSS.*—19. Generally speaking, the heads of Toles are the only persons who have really old and scarce works. They know the value and history of the several works on particular branches of Sanskrit learning to which they severally devote their attention, and each tries his utmost to secure copies of all the leading and rare works bearing upon the subject of his study. It also often happens that the son generally takes up the subject in which his father was most proficient, and in some families for many successive generations the same subject has been studied, and the works collected by them are generally very correct and complete. But the worthy professors, deeply learned as they are, are not open to

worldly influence, and extremely shy and suspicious. In their estimation, the most valued treasures they possess are their MSS., and they evince the greatest reluctance to show them to strangers. Ordinarily they do not flatly refuse access to their stores, though some do so ; but the passive resistance they offer is often insurmountable. The first day's visit is generally passed in conversation ; on the second day a few of the commonest works are shown ; on the third, the proprietor is busy with other duties and has no time to bring out MSS. ; on the fourth day, he is not at home and so on several days are lost, before a really good MSS. is brought to light, and as my plan requires the copying of the initial and final lines, and an abstract of the contents, a great deal of valuable time is lost before a single collection is finally examined, and before this consummation can take place, it often happens that the owner of the MSS. is called away by a distant invitation or some other errand, and my travelling pandit's work is brought to a stop. No possessor of a Tole has any catalogue or list of his MSS. and if by dint of repeating the names of a great number of rare works, the owner is made to acknowledge he has a particular work, very little advance is made towards getting access to it, for the bundles in which MSS. are kept are not numbered, and as from 6 to 20 different works find place in each bundle, the task of finding it out takes days, if it be at all forthcoming, which is not always the case.

In the houses of private gentlemen access is readily given ; but when visits have to be repeated for days, the party in charge of the library offers much passive resistance, and a great deal of time is lost to meet his convenience.

If I could satisfy myself with bare names, the work could advance more expeditiously, but as a work of this kind can only be done once, I think that it is better to lose some time than to produce a result which cannot be satisfactory to scholars. It is not at all likely that an undertaking of this nature will be attempted a second time.

*List of rare works.*—20. With a view to help the travelling Pandit, I have printed two lists of very rare MSS. for which he makes enquiries at every Tole. Copies of these lists have also been sent through the Director of Public Instruction to the heads of all the schools under his controul ; but as yet no satisfactory return has been obtained.

*Compilation of a general list or inventory.*—21. The work under the second head of my enquiry has been conducted by me with the assistance of a Pandit and a writer. The lists procured by the travelling Pandit, and by me through friends and correspondents, are regularly entered alphabetically in a large book, writing only the names of the MSS., their subjects, and the names of their owners. This book when completed will be an inventory of all the Sanskrit MSS. of value extant in Bengal. A compilation is then

made from this record of all works which require to be noticed in detail, and the descriptive accounts are then written out in full.

*Publication of Notices.*—22. At first I was under an impression that separate lists of particular collections would be the best, as suggested in the orders of Government; but I soon perceived that it involved much unnecessary trouble and expense, and caused the repetition of the same names a great number of times. So it had to be given up. The nominal list referred to in the last preceding para. will, I think, when completed and published, supply the information fully and in a handy form.

In the meantime my attention has been devoted to detailed notices of all works not included in the catalogue of the Asiatic Society's collection. Of these "Notices" two volumes and one part have already been published, comprising altogether 861 pages royal octavo, and descriptive accounts of 1140 separate codices. For the sake of carrying on the printing while my researches are in progress, no systematic arrangement is attempted, and manuscripts are noticed as they turn up. The inconvenience arising from this course is, however, obviated by annexing to each volume a classified table, and a full alphabetical Index.

*Contents of the Notices.*—23. The number of Vedic works or portions of the Vedas in the published Notices is limited, and all of them have been seen or obtained at Benares, not a single codex having been seen in the possession of a Pandit of Bengal in the several Toles which have been visited. This total absence of the most important and most revered of Sanskrit works in the libraries of those who have been the principal custodians of Sanskrit literature is a remarkable fact, and it is usually accounted for by the Pandits by reference to a verse of the *Pogini Tantra* which says, "whoever keeps MSS. of the Vedas in his home, soon finds his abode struck by lightning." The verse is obviously due to the sectarian zeal of the Tantra which would admit of no rival in its neighbourhood, but the true cause, I believe, is that Bengal has never been the seat of a Vedic school, and consequently it has never been taught here, nor MSS. prepared or preserved. It is said that when on the overthrow of the Pála rājās, A'disura, the Hindu sovereign of Bengal, wanted to celebrate a great Vedic sacrifice, he could find no native Bráhmaṇ competent to officiate at it, and had to indent for five learned priests from Kanauj. These priests settled in the country, and gave new life to Hinduism everywhere; and many of their descendants have been noted as great scholars and distinguished authors; but they do not seem to have cultivated the Vedas, and there is not a single treatise on the Vedas or Vedic learning among their writings. Their special forte has been philosophy, and works on the subject are abundant everywhere. The Nyáya schools of Tírhut and Nuddia have enjoyed deserved celebrity all over India, and every Pandit of any note has some work or other on the subject, not

common elsewhere. Works on the Vedánta are also numerous. The former class is represented in the published Notices by 98 treatises, and the latter by 67 codices. The Upanishads as bearing on the Vedánta are represented by 92 works. The Tantras come next to Nyáya; Bengal is particularly noted for them, and of them I have noticed 205 works or parts of works. In my last report I have already given an account of the nature and character of this class of works. Grammar, Lexicography, Rhetoric and other branches of Sanskrit learning are also fairly represented in my Notices.

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It should be noted, that in making my selections I have been guided by a desire to exclude all works existing in the Library of the Asiatic Society of Bengal, a descriptive catalogue of which is in the press, and it is not desirable that the same works should be twice noticed. My work will, in conjunction with the catalogue of the Calcutta Sanskrit College and that of the Asiatic Society, constitute a complete record of the bulk of the Sanskrit literature extant in Bengal, and as all the three works are being printed at the cost of Government they may well be taken to be parts of one undertaking.

*Facsimiles.*—24. At the suggestion of Mr. Burnell of Mangalore, I have introduced in the last two fasciculi facsimiles of some of the more ancient and important MSS. noticed. When a sufficient number of these illustrations have been published, they will prove of much use in determining the age of manuscripts from the style of their writing, and as contributions to a knowledge of Indian Paliography.

*Oudh Catalogue.*—25. While carrying my Notices through the press, I have been also engaged in editing a Catalogue of Sanskrit MSS. existing in Oudh. Four fasciculi of this work have already been published.

*Purchase of MSS.*—26. MSS. are not marketable articles; they do not readily find purchasers; the people at large look upon them as worthless; and consequently there are no shops in Bengal for the sale of MSS., while the Pandits of the province who are the principal owners of MSS., look upon them as treasures of inestimable value, never to be parted with on any account. I have, therefore, found the greatest difficulty in buying MSS. in Bengal. The case is different at Banares. From all parts of India, Pandits, at an advanced age, leaving everything behind them, except their MSS., repair to that sacred place to die, and on their demise, hawkers purchase their stocks for a trifle, and subsequently sell them to pilgrims and others at a considerable profit, and my purchases have been made principally from these hawkers. The total of my acquisitions on account of Government comprises 662 codices, mostly entire works, some being frag-

ments of larger treatises. Most of these have been purchased, a few being copied to my order.

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Most of these are new to the Asiatic Society's collection, and are generally old and correct. Several of them are very scarce. A good many relate to the rites and ceremonies of the Vedas. Though small and not of much worth as literary compositions, these last will be found of great value to scholars engaged in the study of the Vedas, as they help materially to illucidate all obscure passages relating to the Vedic ritual. A few are worthless having been taken only because they happened to be parts of collections which the owners would not break up. The names of the works are given in the Appendix. As they have been, or will be, fully described in my Notices, I refrain from giving a detailed account of them here.

*Rare MSS.*—27. Among the MSS. that I have seen or purchased there are, however, some which require special mention here. Following the order of the classification above given, the first work I have to notice is the *Aitareya A'ranyaka* of the *Rig Veda*. Good MSS. of this work are not accessible in Europe, and about eighteen months ago Professor Max Müller called my attention to it, and suggested the propriety of collecting materials for an edition of it for the *Bibliotheca Indica*. I have since found five old MSS. of it with the commentary of *Sāyana*, and a carefully collated text of this work has been prepared for the Press. At the time named, Professor Max Müller also directed my attention to the *Bṛihaddevatā* of *Saunaka*, of which also good MSS. are not available in Europe. I have seen six codices of this work, four of them very old and correct, and belonging to two different recensions. These have all been collated, and an eclectic copy prepared for the Press.

The next work I have to notice is the *Kalpa Sūtra* of *A'pastamba*. The only complete copy of this treatise I have heard of belongs to Mr. Burnell of Mangalore. During my recent tour in the North West, I found several fragments of it. These have all been purchased, and they make up a little over two-thirds of the work.—(22 out of 28 chapters.) I have also found a fragment of *Dhūrta's* commentary on it, and *Kausikarāma's* gloss on the exegesis of *Dhūrta*.

Among *Vaidika* works I should also mention some short treatises on *Vedic Phonetics* which I have met with. These include (1) the *Paṇiniya S'ikshā*; (2) the *Lomas'ī S'ikshā*; (3) the *Kātyāyana S'ikshā*; (4) the *Amoghānandini S'ikshā*; (5) *Kaus'iki S'ikshā*; (6) *Maṇḍuka S'ikshā*; (7) *Nārādīya S'ikshā*; (8) *Pārāsara S'ikshā*; (9) *Kes'avi S'ikshā*, and (10) the *S'ikshā-vivarāṇa*. Seven of these have not yet been noticed by European orientalists.



Under the general head of Kāvya, my acquisitions include a codex of the Bengali recension of the *Sakuntalā* three hundred and two years old: a fragment of the Vrihatkathā of Kshemendra, about four hundred years old; a Sanskrit version of the Hindi Totākahāni or Tales by a Parrot, and a complete copy of Narahari's commentary on the Naishadha.

But the most important of my acquisitions are treatises on the grammar of the Prakrit languages. These include 1st, Audārya-Chintāmani of Subhasāgara; 2nd, Prakṛita-sarvasva of Mārkaṇḍeya; 3rd Prakṛita-kaumudī; 4th Prakṛitalankesvara, of Vāvana; 5th Prakṛita kāmādhenu of the same Prakṛita-lakshana of Chayḍa; 7th Prakṛita-chandrikā; 8th Prakṛita-author; 6th manoramā. None of these has been noticed in Professor Lassen's Institutions Lingæ Prakriticæ, and all of them will, I think, be new to European scholars. The first I believe is the same work which Dr. Hérnle has noticed in the *Indian Antiquary* of August last, but it is there described to be the work of one Subhachandra. My codex comprises only two chapters. It has been copied from a text which, from the appearance of its paper and the antiquated form of its writing, I believe is about five hundred years old.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

#### *Presentations.*

\*.\* Names of Donors in Capitals.

Bulletin de la Société de Géographie, Novre. et Décbr. 1874.

Novembre. C. Ducois de la Haille.—Le cours du Hong-Kiang, ou fleuve Rouge, au Tongkin, d'après les notes et renseignements de J. Dupius. L. Kostenko.—Khiva en 1873.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Annales de la Société D' Agriculture de Lyon, 1871, 1872.

THE AGRICULTURAL SOCIETY OF LYON.

Mittheilungen der Deutschen Gesellschaft für Natur und völkerkunde Ostasiens, December 1874.

THE GERMAN ORIENTAL SOCIETY OF NATURAL HISTORY AND ETHNOLOGY OF EAST ASIA, YOKAHAMA.

Tijdschrift voor Indische Taal-land en Volkenkunde, Deel XVIII, 6th series, Afllg. 5-6, Deel XX, 6th series Deel III, Afllg. 6. 7th series Deel I, Afllg. 4-5, Deel XXI, Afllg. 1-2.

Notulen van de Algemeene en Bestuurs Vergaderingen, Deel X, Nos. 1-4, Deel XI, Nos. 1-4.

Verhandelingen. Deel XXXVI.

Codicum Arabicorum.

THE BATAVIAN SOCIETY OF SCIENCES.

The Antiquities of Orissa, Vol. I, by Babu Rájendralála Mitra.

THE AUTHOR.

Notes on the lost river of the Indian Desert by Surgeon-Major C. F. Oldham.

THE AUTHOR.

Professional Papers on Indian Engineering, No. 15.

THE EDITOR.

The Christian Spectator, No. 45.

THE EDITOR.

Synopsis of the results of the operations of the Great Trigonometrical Survey of India, Vol. II, descriptions and Co-ordinates of the principal and Secondary stations and other fixed points of the Great Arc-Section  $24^{\circ}$  to  $50^{\circ}$  by Col. J. T. Walker, Vol. III, Descriptions &c. of the Karachi Longitudinal series.

THE GOVERNMENT OF INDIA.

Report on the Administration of the Panjab and its dependencies for 1873-74.

THE GOVERNMENT OF THE PANJAB.

Report on the Administration of the N. W. Provinces for 1873-74.

THE GOVERNMENT OF THE N. W. PROVINCES.

Report on Vaccination for 1873-74.

THE GOVERNMENT OF MADRAS.

Catalogue of Sanskrit MSS existing in Oudh edited by Rajendralála Mitra, Fasc. IV.

THE CHIEF COMMISSIONER OF OUDH.

The Cultivation and curing of Tobacco in Bengal. Report on the Land Revenue Administration of the Lower Provinces, 1873-74. Report of the Sanitary Commissioner for Bengal for 1873. Report on the Financial Results of the Excise Administration in the Lower Provinces, 1873-74. The Sukla-Yajur-Veda, Vájasaneyi Saúhitá Mádhyaundiniya Sákhá, Nos. 1-3. Report on the Administration of Bengal, 1873-74.

THE GOVERNMENT OF BENGAL.

Records of the Geological Survey of India, Vol. VIII, part 1.

Annual Report of the Geological Survey of India and of the Geological Museum for 1874. *Dr. F. Stoliczka*.—The Altum-Artush considered from a Geological point of view. *F. Fedden*.—On the evidences of Ground-Ice in Tropical India during the Talcchir period. *T. W. Hughes and H. B. Medlicott*.—Trials of Raniganj Fire bricks.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

*Exchange.*

The Geographical Magazine, January 1875.

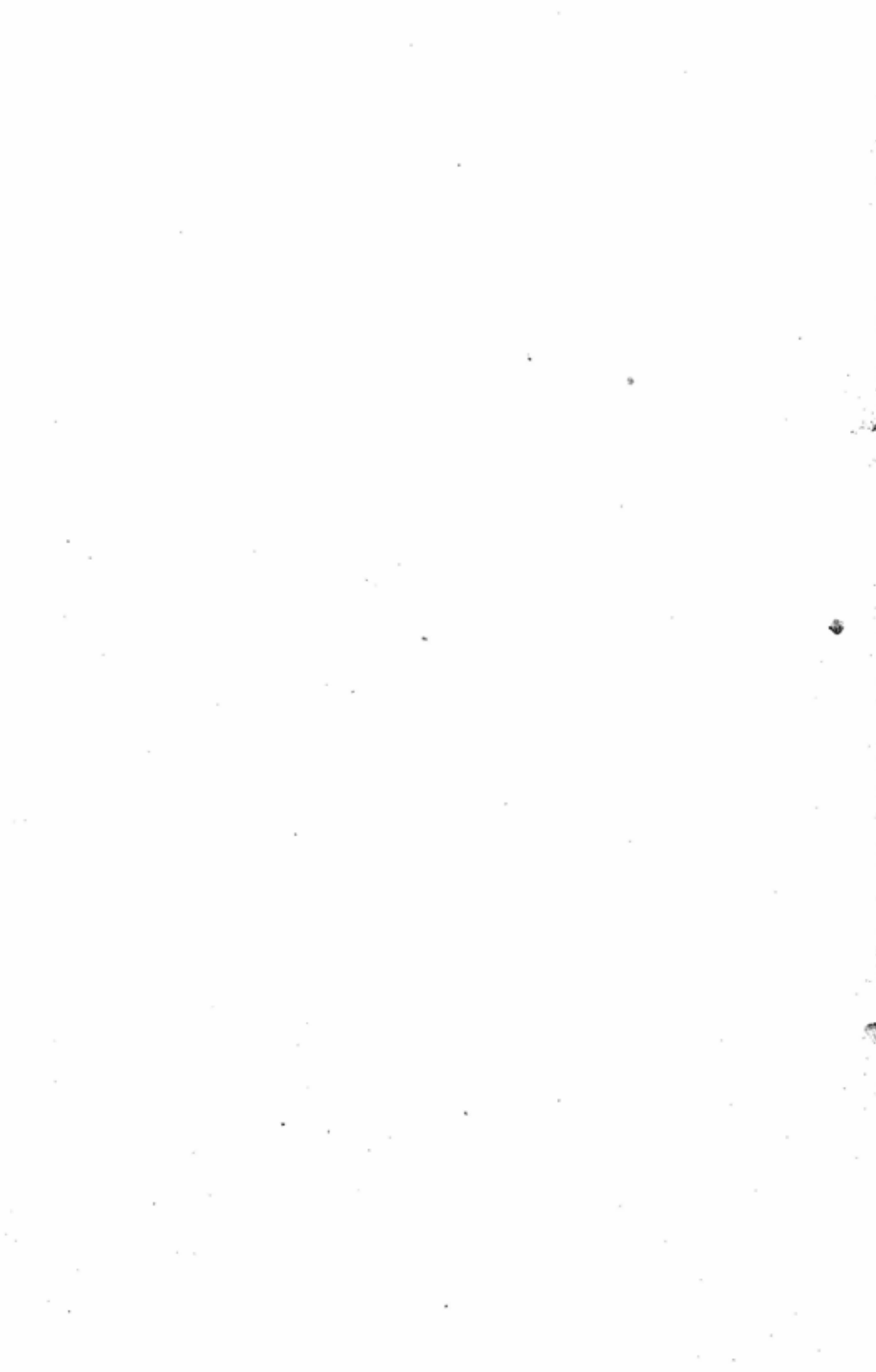
*D. Ker.*—The mineral wealth of Central Asia as bearing on Russian Progress. *E. Schuyler.*—The journey of the Chinese traveller Chang-To-Hui.

Nature, Nos. 270-273.

*Purchase.*

Wood's Journey to the source of the Oxus. Vassilief's *Le Buddhisme, ses Dogmes son Histoire et sa Littérature*. Dr. Lefmann's *Lalita vistara*, part I. Pertsch's *Grammatik Poetik und Rhetorik der Perser*. Jagor's *Reisen in den Philippinen*. Thomas's *Numismata Orientalia*, part I. *Mémoires du Museum d' Histoire Naturelle*, Vols. 1-20. Hodge's *Travels in India*. Bate's *Hindee Dictionary*. Eitel's *Buddhism*. Cherbonneau's *Droit Musulman, du Statut Personnel et des Successions*, Tome II. Mehren's *Manuel de la Cosmographie du Moyen age*. Kern's *The Aryabhattachiya with the Commentary Bhata Dipika of Parmadisvara*. Guyard's *Fragments relatifs a la Doctrine des Ismaélis*.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR APRIL, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 o'clock P. M.

T. Oldham, L.L. D., Vice-President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

From the author, a copy of a work entitled "A Manual of Telegraph Construction," by J. C. Douglas, Esq.

From the author, a copy of a work entitled "Hindu Musical Collections," by Bábu Sourindro Mohun Tagore.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members :—

Major Lord Ralph Kerr, Mathura.

Captain E. A. D. LaTouch, Sámagúting (Assam).

Dr. A. J. Wall, Bengal Medical Service.

The following are candidates for ballot at the next meeting :—

Dr. E. W. Chambers, proposed by Dr. J. Ewart, seconded by Dr. T. R. Lewis.

Dr. J. F. P. McConnell, Professor of Pathology, Medical College, Calcutta, proposed by Dr. T. R. Lewis, seconded by Mr. J. Wood-Mason.

E. C. Carrington, Esq., Chief Civil Assistant Marine Survey Department, proposed by Dr. T. Oldham, seconded by Dr. T. R. Lewis.

The following gentlemen have intimated their desire to withdraw from the Society :—

T. F. Harkness, Esq., Etah.

A. P. Howell, Esq., C. S., Calcutta.

J. Kimber, Esq., Calcutta.

J. Sime, Esq., Delhi.

The chairman announced that the Hon'ble E. C. Bayley had tendered his resignation as President of the Society, and that Dr. T. Oldham had been nominated by the Council as his successor, subject to the confirmation of the present meeting of the Society.

Confirmed.

Also that the Council had nominated Dr. T. R. Lewis to be a Trustee of the Indian Museum on the part of the Asiatic Society, during such time as the office of President shall be held by the Superintendent of the Geological Survey.

Confirmed.

The President reported on the part of the Council that they recommend a grant of a sum not exceeding Rs. 50 per mensem towards the expenses of the preliminary proceedings of the Earth-Current Committee in compiling, calculating and reporting on the Earth-Current Observations made by the Government Telegraph Department. Subject to reconsideration after the expiry of six months.

Confirmed.

Mr. L. Schwendler explained in what manner the system of measuring Earth-currents was to be carried out. The first question to be solved was to prove that the natural currents observed at all times in the telegraphic lines were really due to one and the same cause. For this purpose it was necessary to establish simultaneous observations all over India. After such a general cause had been proved to exist, it would then become necessary to establish a series of measurements at a few selected stations. The Earth-Current Committee would then, it is hoped, be in a position to show results of considerable importance.

The President brought to the notice of the meeting that some tickets of the International Congress of Orientalists held in Paris during the year 1878, have been received for disposal among the Society, the subscribers becoming entitled to the volumes of the Proceedings of the Congress for that year.

The following inscriptions were received from Bábu Harischandra of Banáras, through Bábu Rájendralála Mitra, who has furnished the translations.

No. 1. *From Manikarniká-kunḍa or Chakrapuskarini-tirtha at Banaras.*

- (1.) श्री। व्यासाष्टयुच्चन्द्र १६८० मितेशुभेऽब्दे। मासे शुचौ ब्रह्मतिथौ
- (2.) शिवाया॥ चकार नारायणदासगुप्तः। सोपानमेतन्मणि-
- (3.) कर्षिकायाः॥ १॥ जातः क्षितौ वासवतुल्यतेजाः। सोमान्वये
- (4.) भूपतिवासुदेवः॥ तस्मानुवर्त्तौ मणिकर्षिकाया। चकार सो-

- (5.) पान ततिर्नरेणुः ॥ २ ॥ वासुदेवाग्रसच्चिवो नरेणु \* रावतात्मजः  
 (6.) चक्रवृक्षरिणो तीर्थ जीर्णोद्धारमचीकरत् ॥ २ ॥ शुभम् श्री\*

*Auspicious.* This flight of steps to Manikarniká was prepared by Náráyanadása Gupta for the service of S'ivá, in the fortunate year of sky, eight, six, and moon = 1680, in the month of *Suchi* (Jyeshtha), on the 2nd (brahma) day of the moon.

2. There was born on the earth a king named Vāsudeva, valiant as Indra, and of the lunar race. Narenu a dependant of his, made this flight of steps for Manikarniká.

3. Narenu, a minister of Vāsudeva and son of Rávata, caused the repairs of the Chakratírtha tank to be made. May it prove propitious!

Bábu Rájendralála Mitra said, the great antiquity of the tank being well-known, this inscription was of no use in illustrating its history. The date too being given without any mention of the era, it served no useful purpose in determining the date of the repairs. It was nevertheless of importance, as affording an instance of the use of the word *chakíra* = "made" in the sense of "repaired." In the first two stanzas the word occurs twice, and in both places the clear and unquestionable meaning is, that the *ghat* was made by Narenu, but in the last verse this is explained to mean repairs (*jirnoddhára*) only. In several inscriptions particularly some of Buddhagayá, much confusion had been caused by taking the word in its primary sense, and not as implying repairs. The use of technical terms along with the ordinary names of numerals was also remarkable.

No. 2. *From the Panchagangá ghat at Banáras. Inscribed on the Marhi of Shes'as'ái.*

श्री, सम्वत् १६३७ समये सर्व्वे नाम्नि सम्वत्सरे असाढ़ वदि १० टंडन वंश सम्वत्  
 माधवदासात्मज रघुनाथेन प्रतिष्ठित मिदं वंश गोपाल

*Translation.*—*Auspicious.* This was consecrated by Raghunátha, son of Mádhavadása of the Tandana family on the 10th of the wane in the month of A'shádha, Samvat 1637, in the year named. Sarva (of Jupiter's cycle)." Vansagopála.

Bábu Rájendralála Mitra observed that the *marhi* or domed temple is an insignificant one, but the Panchagangá being a place of great sanctity, is largely frequented. The image in it is of Vishnu sleeping under the expanded hood of a cobra.

No. 3. *From the Draupadi-kunda at Sivapura, being the fourth stage in the Panchakuss'a Yáta, a village three miles from the city of Banáras.*

(1.) श्री गणेशायनमः । — — — — —

(2.) — — — — —

(3.) ॥ १ ॥ प्रत्यर्थिधितिपालकालननुदत्त संलालनेदुतिका । सुद्रांक-

\* Panditas Sítalá Prasáda and Bichanaráma, of the Banáras Sanskrit College, have very much assisted me in reading this.

- (4.) प्रकटप्रतापतपनप्रोद्भासिताशामुखे ॥ चोणेशेकवरे प्रशसति महीं  
 (5.) तस्मिन् दृष्टालावलौ । स्फूर्जन् मौलिमरीचिवीचिरचिरोदकत् पदाम्भोरचे ॥ २ ॥  
 (6.) तद्राजैकधुरन्धरस्य वसुधासाम्राज्यदोचागुरोः । श्रीमद्वनवंशमण्डन-  
 (7.) मणेः श्रीटोडररक्षापतेः ॥ धर्मायैकविधो समाहितमते रादेशतोचीकरत् ।  
 (8.) वार्पी पाण्डव मण्डपे च . . नो गोविन्ददासः सुधीः ॥ २ ॥ कृतुनिगम-  
 (9.) रसात्मा १६४६ समितेवत्सरे ॥  
 सुकृतिरुतिरहितैपी\* टोडरचोणपालः ॥  
 (10.) विहित विविध पूजाचोकरचारवार्पी । निमल सलिलतारां  
 (11.) बहसोपानपंक्तिं ॥ ४ ॥ शुभम् संवत् १६४६ कारफरमाकेदासाद चै ॥

*Translation.*—When the earth was governed by the lord of the world Akbar, whose fame and glory in protecting those who subdued hostile potentates, were prominently stamped all over the quarters like the sun, and whose lotus-feet were resplendent with the waves of refulgent light proceeding from the crowns of kings: the intelligent Govindadāsa made this well at Pāndavamandapa,—by order of king Todara the glory of the Tanḍana race, whose mind was immersed in the laws of religion and wealth, who has the minister (*lit.* the only weight-supporter) of Akbar's dominion, and chief adviser in matters of royal policy.

In the year of the seasons (6), the Vedas (4), the flavours (6), and the soul (1). *i. e.*, 1646, Todara, the protector of the earth, the doer of good deeds, the successful, the well-wisher of mankind, the author of many public works, made this handsome well, full of pure limpid water and provided with a flight of steps. May this prove propitious. Samvat 1646.

Kedara Shah was the architect.

Bābu Rājendralāla Mitrā stated that the end of the first line, the whole of the second line and the beginning of the third line of the inscription were illegible. They probably contained a benedictory stanza, and therefore were not of much consequence. The only matter of importance in the record was the name of the family of Todar Mall which had hitherto been doubtful. On the authority of the inscription this may now be accepted to have been Tanḍava. The name is the same as that which occurs in the second inscription. The last line is in Hindi.

Mr. Blochmann said that Persian historians had not mentioned the family name of Todar Mall, and that they gave Lāhor as his birthplace; but it had now been proved that Todar Mall was born at Lāharpur in Oudh, where he first served as a military officer.

Mr. Blochmann then laid before the meeting, some photographs received through the Hon'ble E. C. Bayley from General A. Cunningham, of the Bharāhat Sculptures and also photographs of two copper-plate grants of one of the Vallabha kings received from Dr. Buhler.



The following papers were read—

1. *Postscript to the List of Chiroptera inhabiting the Khasia Hills,—\**  
by G. E. DOBSON, B. A., M. B.

*BARBASTELLUS DARGELINENSIS.*

*Plecotus dargelinensis*, Hodgson, Ann. Mag. Nat. Hist. 1855, p. 103.

*Plecotus auritus*, Blyth, Cat. Mammal. Mus. As. Soc. Bengal, p. 36, No. 114.

This species, which, on a superficial examination appears not to differ from the European form, may be readily distinguished from that species by the absence of the small, but very distinct, lobe, which in *B. communis*, projects from the outer margin of the ear at a point corresponding to the junction of the upper and middle thirds, and by the conspicuously larger ears which, laid forward, extend beyond the extremity of the muzzle.

*Plecotus homochrous*, Hodgs., a species belonging to a genus closely allied to *Barbastellus* may also be expected to occur in the Khasia Ranges. It is distinguished from *P. auritus*, S. of Europe by its larger ears, by the proportionately much shorter thumb, and by the tail being wholly contained within the interfemoral membrane, not projecting for 0·15 inch., as in the European species.

2. *On a Coin of Kunānda (340 B. C.) found at Karnāl.†*

By BABU RAJENDRALALA MITRA'.

(Abstract.)

The mintage of which the coin submitted to the meeting was a specimen was well known to numismatists; but the specimen was a remarkably perfect one, and it enabled the author to express a decided opinion on the reading of two of the words in its legend. The first word was the name of the king, which Mr. Thomas, in his last essay on the subject in the 1st Volume of the Royal Asiatic Society's Journal (N. S.), had read *Krananda*. This has been questioned and the author has sided with Prinsep and Cunningham in accepting it as *Kunanda*. The second word has hitherto been read *amoghabhratasa*, but the letters on the coin are perfectly clear, and they yield the word *amoghabhatisa* which is obviously a compound of *amogha* "unflinching" and *bhakti* "faith," referring to the 'unflinching faith' of the sovereign who had evinced it by delineating half a dozen symbols of the Buddhist religion on his coin. The old interpretation was "brother of Amogha," but as no king could feel himself flattered by saying that he was the brother of so and so, that is suspected not to be the right one. The presence of an *i* over the *t* in *bhati* is also against that supposition, inasmuch as the Sanskrit *bhrātri* always changed into *bhrāta* or *bhātā* or into *bhrātara* never *bhāti* in the Aryan-Pāli, and there is no reason to suppose that the reading of the coin is an exceptional one.

\* *Vide* Journal As. Soc. B. Part II, No. 4, 1874.

† Received from the Rev. Mr. Carleton of Karnāl.

## LIBRARY.

The following additions have been made to the Library since the meeting held in March last.

*Presentations.*

\* \* \* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXIII, Nos. 156 and 157.

No. 156. *G. Busk* :—Note to the "Report on the Exploration of Brixham Cave."  
*Rev. S. Haughton* :—On the Tides of the Arctic Seas. Part IV. The Tides of Northumberland Sound at the Northern Outlet of Wellington Channel. Part V. The Tides of Refuse Cave in Wellington Channel. *A. J. Ellis* :—On Musical Duodenae, or the Theory of Constructing Instruments with Fixed Tones in Just or practically Just Intonation.

No. 157. *G. F. Rodwell* :—On the Effects of Heat on Iodide of Silver. *R. C. Shettle* :—Experiments showing the Paramagnetic condition of Arterial Blood, as compared with the Diamagnetic condition of Venous Blood.

## THE ROYAL SOCIETY OF LONDON.

Proceedings,—Institution of Mechanical Engineers, August, 1874.  
 Cardiff Meeting, Part I.

*J. McConochie* :—On the Bute Docks at Cardiff and the mechanical arrangements for shipping coal. *G. B. Reunie* :—On the Pumping Machinery for emptying the Dry Docks at Chatham and at Rio de Janeiro.

## INSTITUTION OF MECHANICAL ENGINEERS OF BIRMINGHAM.

The Quarterly Journal of the Geological Society, Vol. XXX. Part 5.  
 No. 120.

*Dr. F. Stoliczka* :—On the Occurrence of Jade in the Karakash Valley, on the Southern Borders of Turkestan. *Dr. F. Stoliczka* :—On the Route traversed by the Yarkund Embassy, from Shahidulla to Yarkund and Kashgar. *Dr. F. Stoliczka* :—On a Visit to the Chaderkul, Thian-Shan Range.

## THE GEOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society of London. Vol. XXXVII. Part IV. December, 1874.

*N. A. Humphreys* :—The Value of Death-Rates as a Test of Sanitary Condition.  
*Professor W. Stanley Jevons* :—The Mathematical Theory of Political Economy.

Statistical Society's Almanack for 1875.

## STATISTICAL SOCIETY OF LONDON.

Journal Asiatique, Paris. Vol. IV. No. 7. October and November, 1874.

## ASIATIC SOCIETY OF PARIS.

Journal of the Chemical Society of London. Vol. XII. Ser. 2. November and December, 1874, and Vol. XIII. Ser. 2. January 1875.

## CHEMICAL SOCIETY OF LONDON.

Bulletins de la Société D'Anthropologie de Paris. April to June 1874.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Jahrbuch der Kaiserlich-königlichen Geologischen Reichsanstalt. Vol. XXIV, No. 3, for July, August and September, 1874.

Verhandlungen der K. K. Geologischen Reichsanstalt, No. 12, 1874.

GEOLOGICAL SOCIETY OF VIENNA.

Hand-List of Seals, Morses, Sea-Lions, and Sea-Bears in the British Museum. By Dr. J. E. Gray, F. R. S., &c., Keeper of the Zoological Department.

A Guide to the Exhibition Rooms of the Departments of Natural History and Antiquities of the British Museum.

TRUSTEES OF THE BRITISH MUSEUM.

Bulletin de la Société Impériale des Naturalistes de Moscou, No. 2, 1874.

Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou. Vol. XIII, Part IV.

IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Bollettino della Società Adriatica de Scienze Naturali in Trieste. No. 1, December, 1874.

ADRIATIC SOCIETY OF NATURAL SCIENCE OF TRIESTE.

Description des Poissons Fossiles provenant des Gisements Coralliens du Jura dans le Bugey, par feu Victor Thiollière.

AGRICULTURAL SOCIETY OF LYONS.

Commemorative Notice of Louis Agassiz. By Theodore Lyman.

AMERICAN ACADEMY OF ARTS AND SCIENCES.

Tijdschrift voor Indische Taal-Land. En Volkenkunde, uitgegeven door Het Bataviaasch Genootschap van kunsten en Wetenschappen. Vol. XXI, Parts 3 and 4. Vol. XXII, Parts 1 to 3.

Notulen van de Algemeene en Bestuurs—Vergaderingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. Vol. XII, Nos. 1 to 3.

NETHERLAND SOCIETY OF SCIENCE OF BATAVIA.

Commencement of the Second Christian Epoch or Christ is coming. By a Christian.

THE AUTHOR.

A Manual of Telegraph Construction. By John Christie Douglas.

THE AUTHOR.

Hindu Music from various Authors, compiled by Sourindro Mohun Tagore. Part I.

THE AUTHOR.

The Christian Spectator for April, 1875. Vol. IV. No. 46.

THE EDITOR.

Ramayan, Vol. V, No. I. By Hema Chundra Bhuttacharya.

THE EDITOR.

General Report on the Operations of the Great Trigonometrical Survey of India during 1873-74. By Col. J. T. Walker, Superintendent of the Survey. (Two copies.)

SUPERINTENDENT OF TRIGONOMETRICAL SURVEY OF INDIA.

General Report on the Revenue Survey Operations, of the Upper and Lower Circles, for season 1873-74. By Col. J. E. Gastrell and Lieut.-Colonel J. Macdonald.

SUPERINTENDENTS OF REVENUE SURVEY.

Report on the Administration of the Registration Department in Bengal for 1873-74. By T. F. Bignold, Esq., B. A., Offg. Inspector-General of Registration.

General Report on Public Instruction in Bengal for 1873-74.

Annual Report on the Insane Asylums in Bengal for the year 1873. By J. Campbell Brown, C. B., Surgeon General, Indian Medical Department.

Papers relating to the Famine in Bengal and Behar, 1873-74. Vol. II.

GOVERNMENT OF BENGAL.

Report of the Committee for the revision of English, Telugu, and Tamil School Books in the Madras Presidency.

GOVERNMENT OF MADRAS.

*Purchase.*

The American Journal of Science and Arts, Vol. VII. Nos. 47 and 48, November and December, 1874.

No. 47. *B. A. Gould* :—On the Number and Distribution of the Bright Fixed Stars. *E. H. Bogardus* :—The Deportment of Titanium with re-agents in Iron Ores containing Phosphoric Acid. *H. P. Armsby* :—Experiments on the Decay of Nitrogenous Organic Substances. *W. Ferrel* :—Relation between the Barometric gradient and the Velocity of the Wind. *J. D. Dana* :—On Serpentine Pseudomorphs, and other kinds from the Tilly Foster Iron Mine. Putnam Co., New York.

No. 48. *F. W. Clarke* :—On the Molecular Volume of Water of Crystallization. *A. M. Mayer* :—On a new method of investigating the Composite Nature of the Electric Discharge. *J. Broeklesby* :—On the Periodicity of the Rainfall in the United States in relation to the Periodicity of the Solar Spots. *J. D. Dana* :—On Serpentine Pseudomorphs, and other kinds from the Tilly Foster Iron Mine, Putnam Co., New York.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, Vol. 48, Nos. 321, 322, 323.

No. 321. *H. Herwig* :—The Heat-conducting Power of Mercury independent of the Temperature. *A. M. Mayer* :—Researches in Acoustics. *F. Guthrie* :—On an Absolute Galvanometer.

No. 322. *F. Guthrie* :—On Salt Solutions and Attached Water. *E. J. Mills* :—On Aniline Derivatives. *P. Smyth* :—Carbon and Hydrocarbon in the Modern Spectroscope. *A. M. Mayer* :—On a new Method of investigating the Composite Nature of the Electric Discharge. *J. L. Soret* :—On Polarization by Diffusion of Light. *Prof. A. S. Herschel* :—On the Spectrum of the Aurora.

No. 323. *W. M. Watts* :—Carbon and Hydrocarbon in the Modern Spectroscope. *Dr. Attfield* :—Note on the Spectrum of Carbon. *L. Schwendler* :—On the General Theory of Duplex Telegraphy. *Sir James Cockle* :—On Primary Forms.

The Annals and Magazine of Natural History. Vol. 15, No. 86.

*M. Ussow* :—Zoologico-Embryological Investigation. *W. Ferguson* :—Description of a supposed new genus of Ceylon Batrachians. *James Wood-Mason* :—On the Genus *Deidamia*, v. W. S.

Quarterly Journal of Microscopical Science, No. 57, January, 1875.

*F. H. Welch* :—Observations on the Anatomy of *Tænia mediocanellata*. *C. H. Golding Bird* :—Imbedding in Elder Pith, for Cutting Sections. *W. Archer* :—On Apothecia occurring in some Scytonematous and Sirospionaceous Algae in addition to those previously known. *E. R. Lankester* :—Observations on the Development of the Cephalopoda. *H. C. Sorby* :—On the Chromatological Relations of *Spengilla flaviatilis*. *Prof. Huxley* :—On the Classification of the Animal Kingdom.

Journal of the Society of Arts, Nos. 1157, 1158, 1159, 1875.

The Quarterly Review, No. 275, January, 1875.

The Doctrine of the Jesuits. The English Bar and Inns of Court. The Judicial Investigation of Truth.

The Edinburgh Review, No. 287, January, 1875.

Lord Ellenborough's Indian Administration. The Agricultural Labourers of England. Progress of Law Reform in England.

Exotic Butterflies, being illustrations of new species, by W. C. Hewitson. Part 93 for January, 1875.

Comptes Rendus Vol. LXXIX, Nos. 22, 24, 25, 26, 1874 and Vol. LXXX, Nos. 1 to 4, 1875.

Revue des deux Mondes, 4 vols. from 15th December, 1874 to 1st February, 1875.

Journal des Savants, November and December, 1874.

Revue Archéologique, Vol. XII, December, 1874.

Mévue et Magasin de Zoologie, Nos. 10 and 11, 1874.

Pratna Kamru Nandini, or the Hindoo Commentator, Vol. VII. No.

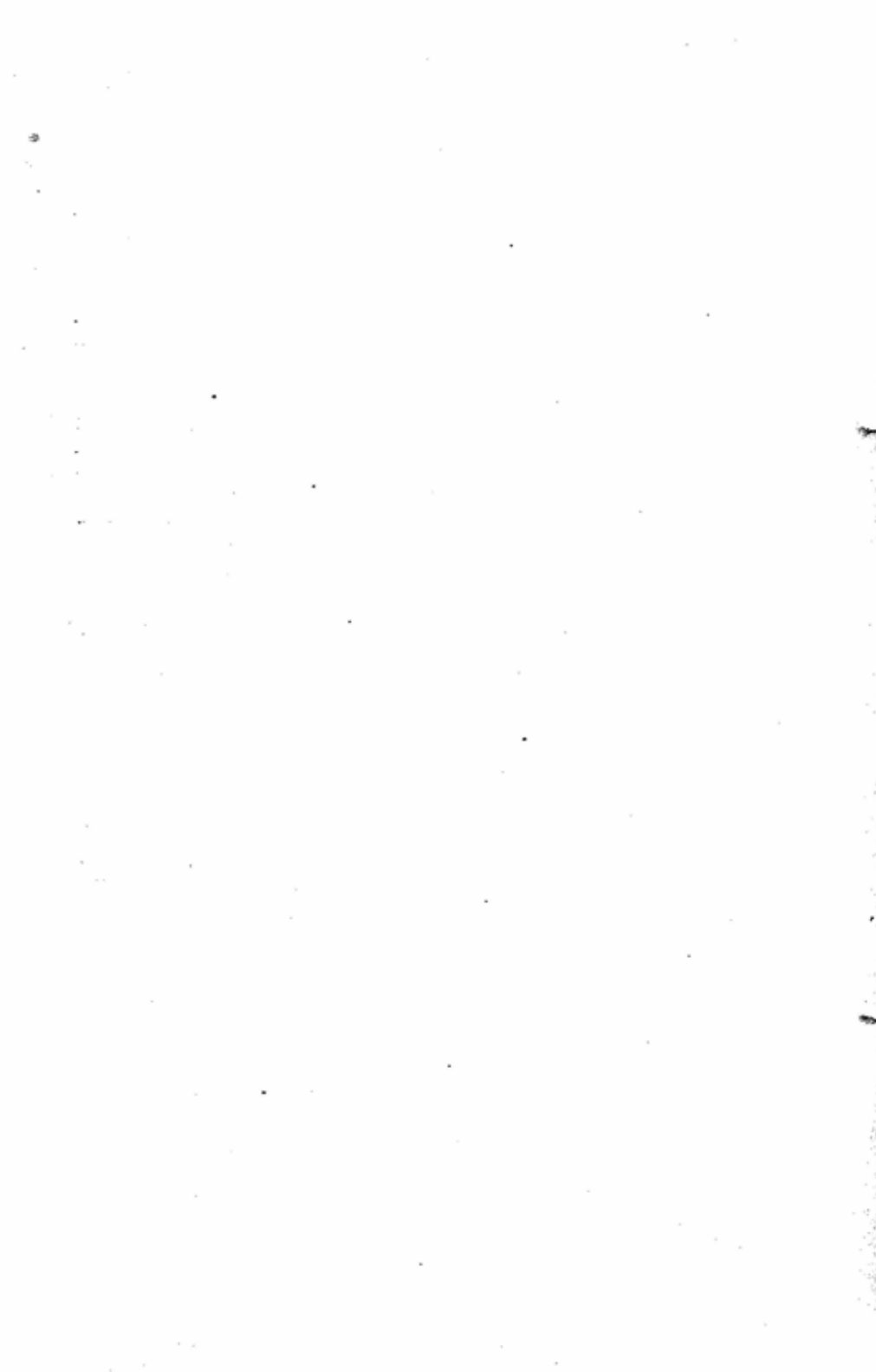
VIII.

### Exchange.

The Athenæum, for December, 1874 and January, 1875.

The Geographical Magazine, edited by C. R. Markham, C. B., Vol. II, Nos. 2 and 3.

Nature, Nos. 274 to 278.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MAY, 1875.

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The Monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentation was laid on the table—

A Copy of "Trudbi Imperatorskago Petersburg, kago Botanicheskago Sada, Tome III, pt. I.," from the Director of the Imperial Botanical Garden, St. Petersburg.

The following gentlemen duly proposed and seconded at the last meeting were elected ordinary members—

Dr. E. W. Chambers.

Dr. J. F. P. McConnell.

R. E. Carrington, Esq.

The following are candidates for ballot at the next meeting—

A. Chennell, Esq., proposed by Mr. Wood-Mason, seconded by Mr. A. W. Chennell.

Dr. G. Thibaut, Anglo-Sanskrit Professor, Benares College, proposed by Mr. H. Blochmann, seconded by Captain J. Waterhouse.

Mr. J. G. Apcar, Barrister-at-law, proposed by Dr. Partridge, seconded by Captain J. Waterhouse.

Mr. A. C. Lyall and Bábu Ganga Prasád Siñha have intimated their desire to withdraw from the Society.

The following letters were read—

1. From MR. R. B. SHAW, *Yarkand*, to the HON'BLE MR. E. C. BAYLEY, C. S. I., dated *Yarkand*, 26th February, 1875.

MY DEAR MR. BAYLEY,—I was much interested in reading your letter of the 11th December. I shall be only too happy to act on the suggestions

which you make for procuring antiquarian information. I have been trying to obtain some, but the frequent revolutions in this country seem to have destroyed most traces of antiquity. I have, however, obtained a good number of MSS., from which I hope to collect materials towards filling up the gap in the history of this country between the times of Mirzá Haidar and the present day. Of pre-Islamitic times there are but few traces left. Khotan probably contains more, witness the coin which you mention. In that centre of early Buddhism with its numerous monasteries, there can scarcely fail to be some relics of antiquity discoverable.

‘I have given notice at all the brass-founders’ shops in Yárkand of my wish to purchase any old coins that may be on their way to the melting pot, but have as yet only succeeded in getting comparatively recent ones with the names (almost illegible) of various Khojas. But I have now discovered the man who obtained the coin you mentioned. At least he described it to me as the image of a four-legged animal on one side and unknown writing on the other. He says he sold it for three tangas (ten annas) to the Pandits left behind by Captain Trotter. I have now despatched him to Khotan with sufficient funds and with orders to make vigorous search for a month in all likely places. He says the coin was found by some men digging in the river banks for gold dust, and bought from them by his brother-in-law. The place was not Kiria, but Doshambih Bázár near Khotan.

‘Kiria is not deserted, but is a town of some 4000 houses, and was visited by Mr. Johnson in 1865. It is just on the verge of the desert, which is supposed to be the site of the towns overwhelmed in the sand.

‘I hear that not long ago some images were discovered in the crumbling banks of one of the rivers of Khotan, but that private diggings are not allowed. If this is the case, I have no doubt I shall be able to get assistance and information from the Dádkhwáh of Yárkand, who is well disposed (as are all the authorities) to help us in all our (to their eyes) curious whims; and who is moreover a learned man and interested in the past. I had been hoping to take advantage of the good dispositions of the authorities to investigate several old monuments bearing unknown inscriptions (probably in Uighur characters), which I hear of in this country, but our plans are now so unsettled that I fear this must be given up. I am, however, making a plunge into the mysteries of the Sarikol and Wakhán dialects, but their interest is purely philological. Without a literature, no antiquarian results are to be obtained for them, excepting in the possibility of tracing some early extension of that section of the Indo-European race over wider areas, by the light of surviving names of places explicable in this dialect.’



2. *A letter from MR. L. B. B. KING, Officiating Collector of Máldah, to the Government of Bengal, dated Máldah, 29th March, 1875.*

‘In reply to your No. 480, dated the 13th ultimo, I have the honor to enclose some brief notes on remaining ruins of Gaur, with reference to obtaining from them specimens of carved or coloured bricks, ornamental tiles, and mouldings.

‘Some of the best specimens of workmanship would lose most of their value, interest, and beauty, by being removed from where they stand, and Government would probably not wish any avoidable injury to be done to the few ancient buildings that now remain.

‘I would, therefore, propose to make a selection from fragments which have become detached, or are found carried away from the buildings to which they belonged, and from portions of buildings likely soon to fall of themselves.

‘I would solicit any further instructions you can afford me on the subject after reference to the notes enclosed on the several buildings, and in particular would ask to be informed how many such specimens are required, and whether any inscriptions should be sent as well.

‘Ornamental bricks and tiles are not likely to be ancient. The most interesting relics are stone carvings, which may have been appropriated by the Muhammadans from very ancient Hindú remains.’

*Notes on the removal of relics from Gaur.*

1. The Khwájah-kí-masjid, or small golden mosque, built of stone in the reign of Sultán Husain Sháh, the king of Gaur, who died 927 Hijrí, is in good preservation. There are three large stones detached opposite the northern gate, the carved tops of which might be sliced off and sent as specimens of the workmanship to Calcutta. The pillar to the right of the doorway will fall when an old tree which has grown into it has decayed. Some stones from this pillar would have interest, and might be removed without doing great injury. There are other handsome carvings on the door, but I could not recommend their removal.

2. In the neighbourhood, at the house of Nazr ‘Alí Sháh, a descendant of a spiritual guide of Aurangzib, I saw three large stones with inscriptions; the largest beautifully carved. They are said to be 250 years old. It is not known when they were brought to where they now are. They should be obtained from their present possessor.

3. The *Rájibí* mosque is small, built of bricks, and did not strike me as interesting; specimens of carved bricks are, however, obtainable from it.

4. The *Daras* mosque, so called from a college which stood near, is a handsome brick building. An inscription now on a new mosque at English

Bazar is supposed to belong to the former, which, if so, was built in 907 Hijrī, by Sultān Husain Sháh. Some of the interior carvings have been carried off, and it would be a pity to take away any of those which remain. I brought with me a few carved bricks which I found lying about, but they are not fair specimens of work.

5. The *Gunnut* mosque is a large stone building without inscription. There are no mouldings remaining, nor anything characteristic, which could be removed. Gold ornaments and coins are said to have been found in a fresh dug hole inside, respecting which I am making inquiry. There is some ornamental stucco work within the building.

6. The *Chorkhānah*, called also Chika masjid, from the bats which now fill it, is situated near the palace, and is supposed to have been either a court-house or a prison. It appears, and is said, to be very ancient, but bears no inscription. Some not very good specimens of coloured bricks might be taken without great harm from the doorway.

7. Near the palace is the *Lukka Chhippi*, a two-storied and imposing-looking city gate. There is nothing characteristic which could be sent from it, nor from tombs which adjoin, one of which, Fath Khān's, is well preserved, but shows little skill in workmanship.

8. The *Qadam Rasūl*, a small square mosque of brick, has been attributed to Husain Sháh, but, according to the inscription, was built by his son Nuṣrat Sháh in 937 Hijrī, in honor of the prophet's foot-print, which is preserved within. The carved brick front is in good repair, and should be kept entire. The inscription in front of the building is legible and well preserved. An inscription belonging to another building has been placed over the gateway. The top of a stone pillar lies in the compound, but is not worth removing.

9. The *Dakhal Darwāzah*, a large city gate of brick, was built by Husain Sháh. An inscription belonging to it has been referred to above. The building is a fine strong one, in excellent preservation, only the south face, in which trees have taken root, is likely to fall. A complete flower in brick-work to the left, and the whole of a carving in brick above the doorway, might be removed from this side, as they will probably be lost in a few years, and are fair specimens of the work. The north side is better preserved, and being likely to last long, should not be touched. Inside are some very beautiful brick carvings, resembling stone; but these ought not to be removed.

10. The Golden Mosque, *Soná masjid*, sometimes called "Bárah-darī", built by Nuṣrat Sháh in 932 Hijrī, is the remains of a fine stone building; a slab which formed part of the base of one of several carved arches, is detached, and might be removed and the carved side sent. Many of these arches have been entirely spoiled; no injury should be done to those which

remain. There is a carved stone fallen from the outside wall, which might be cut and sent, but it is less interesting than the former.

11. The remains of the palace wall (Báis-gazi) are remarkable for strength and height, but have no artistic interest. The carting away of bricks from these has been put a stop to of late years.

12. The minaret of Pirasa is a high tower, with remains of a room at the top. There are good stone carvings at the entrance to the stair, some feet above the ground, but they should not be taken.

13. The well preserved brick carvings on the 'Umar Qázi mosque are good, and should be kept intact.

14. The *Lattin mosque*, which was entirely built of coloured bricks, has no inscription or record of date. The work, even in its present state, has a pleasing effect as a whole, but fragments of it would have comparatively little interest. I brought away some fallen bricks, but these became spoiled from lying on the ground, and give no fair impression of the structure.

15. The remains of Chánd Saudágar's buildings are a large number of grey and black polished stone-pillars, none worth removing, and only interesting as they stand.

16. There are variously coloured bricks in an old secular building, called *Ohumkatti*, and as these are likely to fall (from a tree having spread its roots among them), some might pardonably be removed as specimens.

17. The *Kotwáli Darwázah* is a handsome city gate of brick, in excellent preservation. If an inscribed stone on the roadside, less than a mile off, belong to it, the building was constructed by Sultán Mahmúd Sháh in 860 Hijri. Nothing that would be a specimen of the work could be taken from it.

18. I saw two old mouldings built into houses in a village, Mahdípur, near Gaur, one very beautiful and excellent as a specimen, though somewhat injured by a fire. I would obtain possession of both.

The President said that the Council in a letter to the Government of Bengal had approved of Mr. King's suggestions. It was desirable that the ancient buildings in Gaur should be preserved intact as far as was practicable. In the selection of carved bricks, &c., three sets should be formed, one for the Asiatic Society of Bengal, one for the British Museum, and the third for the Berlin Museum, the authorities of which through Dr. Jagor had applied for specimens. But all inscriptions should be sent to the Asiatic Society of Calcutta, where there were already several slabs from Gaur. Thanks were due to Mr. King for his interesting note.

The following papers were read—

1. *Algarum species in India orientali centrali a S. KURZ collectas determinavit* DR. G. ZELLER.

No. 3518. SPIROGYRA DUBIA, Kg. forma typica et var. longiarticulata mixtae.—Allahabad, in aqua stagnante fluminis Ganges.

No. 3519. SPIROGYRA IRREGULARIS, Naeg.—Mujgowan, in ditione Rewa versus Jabalpure.

No. 3520. CLADOPHORA MACROGONYA, Kg. tab. phyt. IV. 36 (Conferva macrogonia, Lyngb.).—Allahabad, in fluvio Jumna frequens.

No. 3521. OEDOGONIUM n. sp.? cellula basali palmatiloba, curvata, sursum parum incrassata, articulis  $\frac{1}{10}$ — $\frac{1}{8}$ ''' crassis, diametro ad 10-plum. longioribus, ad genicula non striatis; fructicationibus ignotis.—Rewa, Mujgowan, in rivulo ad saxa.

No. 3522. SPIROGYRA SUBAEQUA, Kg.—Allahabad in flumine Ganges.

No. 3523. OSCILLARIA JUMNAE, Z. nov. sp.—Strato tenui, olivaceo, filis rectis, pallide aeruginosis v. lutescentibus, articulis diametro ( $\frac{1}{10}$ — $\frac{1}{8}$ ''' ) triplo brevioribus, ad genicula serie unica v. duplici pulchre granulatis, linea delicatissima dimidiatis, apiculo attenuato oblique truncato, cytoplasmate dilute aerugineo, granuloso. (O. percursae affinis).—Allahabad, in fluvio Jumna.

No. 3524. VAUCHERIA KURZII, Z. nov. sp. Caespitosa, sordide viridis, aetate fuscescens, thallo flaccido, ramoso, oogoniis undique egredientibus, parvis, plerumque ternis, interdum solitariis, geminis seu quaternis, pedicellatis, globosis, ( $\frac{1}{10}$ — $\frac{1}{8}$ ''' diam.) ore laterali producto rostellatis, sporodermate achroo involutis, antheridiis sparsis, rectis.—Rewah, Mujgowan, in rivulo ad lapides.

No. 3525. OEDOGONIUM TENELLUM, Kg.—Allahabad, in flumine Ganges ad Zannichellias frequens.

No. 3526. MESOCARPUS SCALARIS, Hass.—Rewa, Mujgowan, in rivulo ad saxa.

No. 3527. SCHIZOTRICH AURANTIACA, Kg. var. crassa, Z.—Vaginis ad  $\frac{1}{10}$ ''' crassis filis inclusis plerumque solitariis, apice obtusis,  $\frac{1}{10}$ — $\frac{1}{8}$ ''' crassis, raro binis et pluribus tenuioribusque, articulis diametro aequalibus vel parum brevioribus, saepe obsoletis.—Bengalia inferior, ad arbores in orientali parte ditionis Sunderban.

2. *On the Khyeng People of the Sandoway District, Arakan.*—By MAJOR G. E. FRYER, M. S. C., Deputy Commissioner Sandoway.

(Abstract.)

The Secretary read the first part of the paper, which contains census tables, details of measurements of skulls and limbs, and gives an account

of the customs and manners of Khyengs, or Hiou or Shoo, as they call themselves. The second and third parts contain a grammatical analysis of the language of the tribe and a Khyeng-English and an English-Khyeng Dictionary. The article will appear in No. 1 of this year's Journal.

Mr. Wood-Mason remarked that he was quite prepared to be told that the tribe which formed the subject of his friend Major Fryer's interesting paper were dolichocephalic; for he himself had measured numerous skulls belonging to various closely-allied mongoloid tribes inhabiting the hill-ranges of our N. E. Frontier, but had not hitherto met with a single instance in which the transverse diameter of a skull exceeded eight-tenths of its length. He had also examined, at the request of Sir George Campbell, the crania of eleven members of the party of Kúki chiefs which had recently visited Calcutta under the charge of Captain Lewis, with the following result:—

Lushai, male (No. 1)	was orthocephalic, his cephalic index being	·74
" " (No. 2)	" subbrachycephalic " " "	·78
" " (No. 3)	" " " " " "	·77
" " (No. 4)	" orthocephalic " " "	·756
Rathey " (No. 5)	" subbrachycephalic " " "	·79
Lushai " (No. 6)	" orthocephalic " " "	·74
" " (No. 7)	" " " " " "	·74
" " (No. 8)	" mecocephalic " " "	·73
" " (No. 9)	" orthocephalic " " "	·74
" " (No. 10)	" mecocephalic " " "	·72
" " (No. 11)	" " " " " "	·73
A skull of a female of the same tribe was mecocephalic,		·71

Of these eleven males, taken as a whole, it would be seen that no one had a cephalic index so high as ·8; that three were subbrachycephalic, three mecocephalic, and the remaining five orthocephalic, the degree of long-headedness termed orthocephaly greatly preponderating: in connexion with which it was interesting to note that the mean ceph. index was ·748, or also orthocephalic, and that the only female examined in accordance with the usual rule, was larger headed than the longest headed male. In reply to the author's assertion that in females the extreme transverse diameter of the skull was, in proportion to the length, greater than in males, which was tantamount to saying that males were longer-headed than females, all he would say was, that whenever any such difference between the sexes had been observed, it had been exactly the reverse of that asserted. In conclusion he thanked the author for the most interesting paper that, for a long time, it had been his lot to listen to.

Mr. Schwendler then gave an interesting account of the peculiar habits of the "red cat-bear," *Ailurus fulgens*, and illustrated his remarks by exhibiting a living specimen, which he received some months ago through the kindness of Captain Hartopp, who obtained the animal from Darjiling.

He stated that the animal was first described by Cuvier, who referred it to a special *genus*, of which, however, up to the present time it is the only *species* known. General Hardwicke was the discoverer of the animal, and in Jerdon's "Mammals of India" a very good description of it will be found.

Mr. Schwendler called special attention to the peculiar manner in which the cat-bear feeds. It takes a piece of bread soaked in milk into its mouth, and then throws back its head, so that the piece of bread slips down into its throat by its weight, after which it begins to swallow. If the piece of bread is not quite in the right position in its mouth, the little animal makes use of one of its forepaws in a most comical manner to put it right.

The animal is said to be very rare, and has probably never reached Europe alive. It lives at from 7,000 to 12,000 feet above the sea level, in the South-Eastern ranges of the Himálayas. It seems, however, to be standing the hot season of Calcutta very well.

The general form of the body is that of a bear; it has the tail of a fox, the head between that of a cat and a fox, and the ears of a lynx. Mr. Schwendler said, the various animals in his deer-park were not the least afraid of the bear-cat—not even when it was a stranger in the place. It was quite a different thing, he said, when last year he introduced a young panther (*felis parvus*), scarcely half the size of the bear-cat, into the park. Then the whole deer-park was in a commotion, the spotted deer (*axis maculatus*) giving their peculiar cry of fear and stamping with their fore-feet; the fawns seeking the protection of their mothers; the pheasants taking up the signal; the black buck scampering to and from with their deep peculiar grunt; the graceful gazella Indica observing and hissing at short intervals; the *cervulus aureus*, at other times quite tame, running in its peculiar hopping style all round the park and barking; and even the samburs (*rusa Aristotelis*), large as they are, with tail erect, head thrown up, and lifted foot prepared for battle.

The above facts prove almost conclusively that the *Ailurus fulgens* is not carnivorous—at any rate so far as the deer tribe is concerned.

The President remarked that now that the scheme of a Zoological Garden for Calcutta had been taken up by the Lieutenant-Governor of Bengal, its establishment was sure to become a fact, and he hoped Government would soon carry out the project, so as not to be deprived of Mr. Schwendler's valuable assistance.

## LIBRARY.

The following additions have been made to the Library since the Meeting held in April last.

*Presentations.*

\*\*\* Names of Donors in Capitals.

Journal of the East India Association, Vol. VIII, No. 3.

EAST INDIA ASSOCIATION.

Bulletin de la Société de Géographie, for January and March, 1875.

L'ABBE' ARMAND DAVID, Voyage en Mongolie (avec carte).—LE COMTE MARESCALCHI, Notes géographiques sur la Birmanie Anglaise suivies de quelques mots sur les Shans et sur les Kahyons de la Birmanie indépendante.—Notice sur Thanh-Hoa, province du Tongking.

SOCIÉTÉ DE LA GÉOGRAPHIE, PARIS.

Mittheilungen der Schweizerischen Entomologischen Gesellschaft. Vol. IV, Pt. 6.

SOCIÉTÉ ENTOMOLOGIQUE SUISSE.

Trudbi Imperatorskago Petersburgkago Botanischekago Soda. Tome III., Pt. I.

THE DIRECTOR OF THE IMPERIAL BOTANICAL GARDEN OF ST. PETERSBURG.

Monatsbericht der Königlich-Preussischen Akademie der Wissenschaften. November and December, 1874.

OLSHAUSEN, Ueber den Ursprung und die verschiedenen Bedeutungen des persischen Wortes Pahlaw und über den Sinn des Wortes Mäh in den Benennungen vieler persischer Oertlichkeiten.—WEIERSTRASS, Zur Theorie der eindeutigen analytischen Funktion einer Veränderlichen.—SIEMENS, Beiträge zur Theorie der Legung und Untersuchung submariner Telegraphenleitungen.

BERLIN ACADEMY.

The Christian Spectator for May, 1875. Vol. IV, No. 47.

EDITOR.

A report on Sanskrit MSS. in Native Libraries, by Rājendralāla Mitra.

AUTHOR.

Notes on the Saka Samvat and Gupta Eras, by James Fergusson.

AUTHOR.

Vocabulary of Dialects spoken in the Nicobar and Andaman Isles, by F. A. de Roepstorff.

Yayurveda Sanhita. Nos. 4 and 5.

HOME DEPARTMENT, GOVERNMENT OF INDIA.

General Report on the Operations of the Great Trigonometrical Survey of India during 1873-74.

REVENUE DEPARTMENT, GOVERNMENT OF INDIA.

Minute by the Hon'ble Sir Richard Temple, K. C. S. I., Lieutenant-Governor of Bengal, on the late Famine.

GOVERNMENT OF BENGAL.

A Catalogue of Sanskrit MSS. in private libraries of the N. W. Provinces.

GOVERNMENT, N. W. PROVINCES.

General Report on the Topographical Survey of India and of the Surveyor-General's Department, for 1873-74.

SURVEYOR GENERAL.

Memoirs of the Geological Survey of India. Records of the Geological Survey of India. Vol. VIII, Pt. I, 1875.

Annual Report of the Geological Survey of India for 1874.—F. STOLICZKA, The Altum Artush considered from a Geological point of view.—F. FEDDEN, On the evidences of "Ground Ice" in Tropical India during the "Tachir Period".—J. W. HUGHES AND H. B. MEDLICOTT, Trials of Raniganj Firebricks.

SUPERINTENDENT, GEOLOGICAL SURVEY OF INDIA.

Journal of the Agricultural and Horticultural Society of India.

Vol. IV., Pt. II. T. M. FRANCIS, Notes on the propagation of Plants by leaves.—REV. T. A. C. FERMINGU, Cultivation of the Mahogany tree in Bengal.

Vol. V., Pt. I. BARON FERDINAND VON MUELLER, Note on *Eucalyptus globulus*, the genuine Blue Gum tree.

AGRICULTURAL AND HORTICULTURAL SOCIETY.

### *Purchase.*

The Calcutta Review. No. 70, April, 1875.

Annalen der Physik und Chemie. Vol. 154, Pts. I and II, 1875.

F. BRAUN, Ueber die galvanische Leitungsfähigkeit geschmolzener Salze.—F. KOHLRAUSCH UND O. GROTRAIN, Das elektrische Leistungsvermögen der Chloride von den Alkalien und Alkalischen Erden so wie der Salpetersäure in wasserigen Lösungen.—H. WEBER, Zur Theorie des Galvanometer.—W. A. NIEFOLDT, Ueber die Wahl des Querschnitts von Blitzableitern.—M. SEKULIC, Ueber die an bestaubten und unreinen Spiegeln sichtbare Interferenz Erscheinung.—E. WIEDEMANN, Ueber die Leitungsfähigkeit der Halbidverbindungen des Bleies.

### *Exchange.*

The Indian Antiquary. Vol. IV, Pt. 42, May, 1875.

PHEAR, Glimpses of old India as seen through the pages of Manu.—McCORKELL, A legend of old Belgam.—MISS E. LYALL, Biographies of Asvagosha, Nagarjuna, Aryadeva, and Vasubandhu, translated from Vassilief.—MAJOR J. W. WATSON, Speculations on the origin of the Chávaḍas.—C. H. TAWNEY, Metrical translation of Bhāṭṭṛīharis Nīti Sātakam.

Nature. Nos. 279 to 282.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JUNE, 1875.

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The monthly General Meeting of the Society was held on Wednesday the 2nd instant at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

1. From the Author, a copy of a work entitled—"The Fair at Sakhi Sarwar," by M. Macauliffe, Esq., B. A.
2. From the Author, a copy of a work entitled—"Uttra Rám Chari-ta" and another entitled "Malavikagnimitra," by C. H. Tawney, Esq., M. A.
3. From the Asiatic Society of Japan, Transactions, Vol. III, Pt. I, 1874.
4. From Captain J. Waterhouse, a set of Photographs taken at Camorta, in the Nicobar Islands.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

A. Chennell, Esq.

Dr. G. Thibaut.

J. G. Apcar, Esq.

The following are candidates for ballot at the next meeting—

C. Girdlestone, Esq., C. S., Resident at Nepal, proposed by H. B. Medicott, Esq., seconded by Captain J. Waterhouse.

Montgomery G. Stewart, Esq., Calcutta, proposed by Dr. T. Oldham, seconded by Mr. H. Blochmann.

Mr. F. Black, District Engineer, Hamirpur, proposed by V. A. Smith, Esq., seconded by Captain J. Waterhouse.

J. R. E. Gouldsbury, Esq., Pleader, Chief Court, Montgomery, Panjáb, proposed by M. Macauliffe, Esq., C. S., seconded by H. Blochmann, Esq.

Letters were read—

1. From W. Theobald, Esq., laying before the meeting, at the request of Mr. H. H. Locke, two perforated stone implements found in the bed of the river Mun at Kharakpūr, together with the following extract from a letter from E. Lockwood, Esq., Collector of Mongher, detailing the particulars of their discovery.

"I am sending you two fine specimens of stone implements which I heard of when I was at Kharakpūr on Thursday and which I have just received. You may rely on their being genuine, although the hole in the smaller stone appears as fresh and smooth as if made yesterday. (Chisel marks which I saw in the quarries beneath Jerusalem made by workmen in the days of Solomon appear equally fresh).

"These stones were lately found in the bed of the river *Mun* at Kharakpūr.

"This river is being dammed up at a vast expense by the Darbhanga estate, under the Court of Wards, and deep foundations are being made in the river bed for a wall to join the two hills through which the river runs.

"I enclose the note from Mr. Inman, Superintendent of Works, which came with the stones.

"The smaller stone was found 16 feet below the river bed.

"Years ago this river was the resort of many wild animals.

"The surrounding hills are metamorphic.

Extract from Mr. Inman's letter to Mr. Lockwood—

"I have much pleasure to send you two remarkable perforated stones which I wish to present to your museum. I also send you several other stones found in the same locality, some having the shape of mangoes and one of an oyster, the rest are simply water worn.

"The smallest one was found 10 feet from the coffer dam, the largest close by the dam, near the bags, and within ten days of each other. They were not amongst any soil, but imbedded in a complete mass of large and small stones, and the largest stone must have been about the same depth as the smallest, 16 feet. If any thing it was deeper by a foot, say 17 feet from surface, so far as I can remember."

Mr. Theobald writes—

"It is not easy to say very positively to what purpose these articles were put, but I think the suggestion of Dr. Oldham, to whom I showed them, is the correct one, that they are portions of the upper stones of 'Querns' or hand mills. The circular hole in the middle displays considerable polish such as alone could have been produced by rotation on a fixed axis. Doubtless the original size of these articles was much greater; and it is very desirable that any other objects, even though in a fragmentary condition, should be forwarded to the Geological Survey Office, where every facility exists for

their due comparison and determination—and where an admirable series of ‘palæolithic’ and ‘neolithic’ implements has already been brought together.

“The antiquity, however, of these implements is probably very inconsiderable, and the probability is great, that other objects of cotemporaneous industry will be found in the same layer whence these were extracted, if diligent search be made.”

Mr. Ball said—

“For comparison with the perforated stones now exhibited I have brought to the meeting the highly finished hammer-stone which was described and figured by me in the Proceedings for April 1874. I have also brought a volume of the *American Naturalist* for 1873 in which, since my paper was published, I have found descriptions and figures of perforated stones which are said to occur in great abundance on both banks of the Susquehanna river near the small town of Muncy in Lycoming country, Pennsylvania. The resemblance between these hammer-stones and mine from Mopani is very striking, with this exception, however, that the hollows on the opposite faces of the pebbles were not generally carried sufficiently deep to meet, and so cause an actual perforation. This is, however, the case with some of the European implements.

I quite agree with Mr. Rau, the writer of the paper, that these stones were not suited to the manufacture of flint flakes, as has been suggested by some authorities.

To those who believe in an Asiatic origin for the North American Indians, the fact I have pointed out may, perhaps, be not without interest.

The perforated stones exhibited by Mr. Locke, and which I see now for the first time, are of too soft material to have been used as hammer-stones. Whatever may be their supposed antiquity, the use they can have been put to, is I should think, extremely doubtful.

2. From the Assistant Secretary to the Government of Bengal forwarding the following correspondence with a report by Mr. H. J. H. Fasson on a Whirlwind which occurred in the Maimansingh District on the 26th March, 1875.

No. 77, dated Dacca, the 22nd April, 1875.

*Memo. by F. W. PEACOCK, Esq., Officiating Commissioner, Dacca Division.*

Copy, with the enclosure in original, submitted to the Government of Bengal, Judicial Department, for information. This storm, which occurred exactly one week after the one reported in my memorandum No. 60, dated 30th ultimo, was not so destructive, though its violence would appear to have been greater.

2. Both appear to have been of exactly the same character. It is most fortunate that the damage done has, comparatively speaking, been so slight.

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No. 562, dated Camp, Jamálpúr, the 18th April, 1875.

*From R. H. PAWSEY, Esq., Officiating Magistrate of Maimansingh.  
To The Commissioner of Circuit, Dacca Division.*

I have the honor to forward herewith, for your information, a report from Mr. Fasson, Assistant Magistrate of A'tiah, giving the details of the ravages of a whirlwind in the neighbourhood of Nagarpúr, and about 18 miles south-west of the sub-divisional head-quarters, on the evening of the 26th March.

2. The loss of life was not so serious as in the storm near Ishwar-ganj, reported to you in this office letter No. 524, dated 8th instant, nor was the destruction of property anything like so extensive, but the violence of the wind appears to have been irresistible in its limited course.

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No. 5, dated Tangail, the 8th April, 1875.

*From H. J. H. FASSON, Esq., c. s., Assistant Collector of A'tiah.  
To The Collector of Maimansingh.*

With reference to your No. 485, dated 2nd instant, I have the honor to submit the following account of the atmospheric disturbance which resulted in the partial destruction of the villages of Uladah and Chanbári on the 26th March, 1875. I visited and carefully examined the ravaged tract myself and obtained the fullest information available from the villagers and the injured persons in the dispensary. Their accounts were necessarily fragmentary, confused and imperfect, but there is no doubt as to the general character and course of the storm.

2. It was simply, though on a large and tremendous scale, such a swirling eddy in the hot sultry air as may often be observed on a hot day catching up leaves and dust, whirling away over a field or so in a rapidly developed swirling pillar of dust, and then subsiding and dissipating as it had arisen.

3. In this instance the duration of the whirlwind was probably less than twenty minutes at the outside; the breadth of its path just 250 yards; the length of its course from formation to dissipation a little over two miles. Its course was almost exactly from south-west to north-east. The time of its occurrence was just after dusk, or about an hour after sunset. The cattle were in the cow-houses, the people for the most part busied in their *baris*.

4. Due west from Shakhairliá Khál the great river Jamuná flows in a single stream some three miles wide, with the Pabna shore beyond. Look-

ing south-west from the same spot, there lies in the midst of the stream a large chur, the breadth of water between the khal and this chur being about a mile. Somewhere in this mile-broad stream the eddy arose. Boats moored along the chur felt no disturbance. The day had been hot without a breath of wind. Clouds lay in the south-west quarter only. About an hour after sunset, the eddy, already a roaring whirlwind, carrying with it a swirling waterspout some 10 feet in height, judging from the height of the water-mark on the bank, struck the eastern bank of the river at Shakhairlia Khál. Here were moored eighteen large boats, most of them freight-carrying masted boats of many maunds burden. All these were instantly overturned, shattered, stove in, or flung on shore; one large boat was lifted bodily into the air, carried over the bank 15 feet in height, and dashed to pieces in a field some 30 yards inland; another small boat, carried a somewhat shorter distance, lies in a field, with the keel smashed in and the ends split open. A large boat lifted up, overturned, and flung down on the beach, struck down a man, crushed him into the sand beneath it, and killed him. Another man, carried off his feet, was dashed down and killed. A third man struck down, and his skull fractured by some fragment, lingered some half-hour and died. Another *khál*, some 300 yards to the north, remained tranquil and undisturbed. The whirlwind passed on north-eastward over some half mile of maidan covered with cheena crops. Here no trace of its progress appears, the crops are unhurt, and not even flattened, but show no sign. Then came the village of Uladah, stretching north and south some half a mile. In a moment the hurricane had passed through, leaving a strip 250 yards broad of utter devastation, while all remained untouched to the north and south of its path. In this strip not a house was left standing; the roofs were whirled off, the walls stripped away; the wooden posts torn away with such violence as to break up and disintegrate the earthen *bhitus* in which they had been fixed. All the plantain trees were wrenched off or uprooted; twelve large mango trees were torn up by the roots; all the trees that remained standing were stripped off their branches, large and small, which were snapped off close to the trunk. A pool of water in the midst of the village is heaped up with broken branches. The bamboo clumps were twisted round and laid flat, the stems being broken up near the roots. In this village 140 *ghars* were destroyed, 17 people were hurt, some badly, and seven cattle killed. A dead cow was found among the broken branches of a mango tree some thirty feet above the ground. The whirlwind continued its north-east course across a maidan of more than a mile, covered with cheena for the most part. Here, again, it left no trace, except where a long slip of bushes ran along an *ail* parallel with the direction of the storm. These were flattened. Then the storm struck the northern end of the village of Chanbári, part of the path passing clear of the village to the

north, and encountering nothing but a fence a foot high edging a field ; this it destroyed, breaking off and throwing down the branches of which it consisted. That part of the whirlwind which struck the village encountered first a dense mass of tall "*baint*" jungle, such as would afford cover for leopards. This was beaten down flat, as though it had been thoroughly trampled by beating elephants. Chats, mats, and beams lie confusedly amongst the flattened and prostrate masses of "*baint*." Beyond the *baint* lay the bamboos and *báris* of the village ; these were destroyed as in the former village, the devastation here being equally complete, and the breadth of the path the same, some fifty yards of it passing clear of the village to the north-south of the whirlwind's path ; the plantains, bamboos, *báris*, and jungle stand entirely intact and undisturbed. In this village 89 *ghars* were destroyed, 19 people injured, one woman killed. No cattle were killed or hurt. This, the people explain by saying that the cowhouses bore the brunt of the storm, and were whirled off, leaving the cattle safe, while the people running out into the open were struck down by branches of trees and other whirling debris. Everything was over in a moment. This village stands at a bend of the river Lohai, which comes down towards it from the north-east, and turns off south-eastward, passing the east of the village. The whirlwind then passing the village entered upon the course of the river, and passing upwards a short distance along the north-eastern bend of the stream, gradually dissipated itself and sank to rest. The course was thus, as here sketched, about 250 yards broad and two miles in length.

5. No one seems to have seen the approach of the wind in either of the villages, from which it seems that it must have travelled fast, though the onward course of a storm of this kind is not necessarily rapid ; it is the rapidity of the whirling motion that does the mischief. But alike at the *khál*, at Uladah, and at Chanbári, the story is, "we suddenly heard a booming, whirling sound as loud as the firing of cannon ; all became dark, but with a sort of fiery glare in it ; there was a sense of suffocation from the tremendous whirling of the air, and in a moment everything was swept off and whirled away in all directions. In a minute it was all over." The weather was hot and clear up to the moment of the whirlwind ; after it passed, heavy rain immediately followed. I asked a wounded woman how her child escaped. She showed me by gathering it up and crouching over it on hands and knees, saying this was what she did when the storm struck them.

6. It does not appear from the debris whether the revolution was from right to left or from left to right ; the broken plantains and flattened bamboos lay in different directions. One *ghar* in the edge of the path was merely crushed in, the posts being broken and the roof fallen inwards ; but everywhere else the wall and roofs were stripped off upwards and carried

clear away. Many *ghars* of Chanbári were carried into the Lohai river. One or two bamboo clumps remain strangely intact with ruin all around them. All the people speak to a fiery appearance or ruddy glare; some who looked from the khal after the storm had passed, say they at first imagined the villages would take fire, as the whirlwind reached them. It must be remembered too that it was all but dark at the time. I do not remember to have anywhere read of the appearance presented by a whirlwind of this kind in the dark. There might probably have been electrical disturbance involved in the phenomenon. All speak, too, to the loud, booming sound with a sort of pulsation in it: "shob, shob, shob" is the imitation they give. This would be the sound naturally produced by the rapid whirling of the air.

7. The storm was thus strictly a whirlwind, springing up in a sultry calm, travelling in a straight north-easterly course; with a diameter of 250 yards; with an internal motion of whirling and ascension, and doubtless a tranquil centre of revolution round which the air swirled upwards like a funnel, and dissipated as it had arisen after a course of about two miles.

8. The villages concerned are situated about 18 miles south-west of Tangail and 5 miles north-east of Nagarpúr. The loss suffered has been only of the huts and broken crockery. The crops have not suffered at all, and there was hardly any loss of cattle.

Mr. H. F. Blanford said that, although whirlwinds were very ordinary phenomena the one described was, nevertheless of special scientific interest, since it seemed to have originated over the bed of a large river, instead of over hot plains, as is generally the case.

Mr. W. G. Willson said that, whirlwinds of this class were by no means rare in Bengal. A short account of one which occurred near Sátkhírá, in the 24-Parganahs, at 6 P. M. on the 25th of April, 1872, had been communicated by him to the Society at the June meeting of the same year. It was very similar, as regarded extent, direction of propagation, duration and extraordinary violence, to the whirlwind so graphically described in Mr. Fasson's letter. He had received several brief notices of similar tornadoes in the Nadiá district. Two had occurred in the thannah of Bhadalia in 1874; one on the 11th of February, the other at 5 P. M. on the 16th of September. There were also records of whirlwinds in the same district in April 1871 and in September, 1872.

3. From W. B. Martin, Esq., Deputy Collector and Magistrate, Madhipúrah, Bhágulpúr, forwarding an inscription found at Srínagar, near Madhipúrah.

MY DEAR MR. BLOCHMANN,—I send you a second rubbing, the words of course, can easily be seen to be "Magurdhaj Jogi 100." I send a small

sketch with it to show you on what part of the stone the inscription was found. I will now describe the village, and tell you what little I can gather about its history.

'The village is called Srínagar and is situated about 10 miles north-west by west of Madhipúrah.

'The centre of the village is on a raised piece of ground, and immediately at the bottom of the western slope of this high ground is situated a fort about 400 yards square with an entrance on one side only facing east. On the northern extremity of the ground is a high mound, said to be a "baithak" or sitting-place; due west of this baithak, north of the fort, and about equidistant from both, is the ruined temple from which I got the inscription. This temple seems to have been made of Rájmahal stone, clamped, or rather rivetted, together with iron; the room (only one, as usual in modern temples) is about 8 feet square with stone walls still visible, about 2 feet high. At the doorway stand three slabs, two carved as shewn in my sketch, and one simply cut in steps longitudinally. The piece (marked B in sketch) seems to have been the piece which went over the doorway, but evidently the *lower* portion was not the *lowest* stone *above* the door—this is clearly missing. A few pieces were lying here and there but formed only steps or portions of the walls, two pillars stood opposite the doorway about 20 feet from it. The door faces west. Having told you this much, I must tell you what the natives say about the place. "Srínagar was one of the chief towns in the ráj of Sebai Singh, a Bhór Rájá. On his death he left three sons, Bijol Deb, Kop Deb, and Siri Deb. Siri Deb built a fort in this village and called the village, from that time Srínagar. He alone, or with his brothers' help also, dug two high tanks, one near Parmánpúr south west of Srínagar, and one west of his Srínagar fort, the former called Kopo or Ghopa, the latter Harsar, both still distinguishable, the former clearly so. Bijal and Kop "garhs" are, too, still visible. These stones are Buddhist stones." This is the story as related, but from the good state of preservation in which I find the fort, and wretchedly dilapidated state of the temple, and from other stories about the Bhors, I should say the temple is by far the older building, and the Bhors had nothing to do with its *erection*, though they evidently used the building and bricked up the tottering walls to keep them standing. In a Gosain's hut, now on the spot, there are two Rájmahal stone "Ganeshes" and two "lings" with their stone basins.

The President announced that the late Assistant Secretary, Bábu Pratápachandra Ghosha having resigned, Mr. G. S. Leonard had been appointed Assistant Secretary with an agreement for two years, after probation for three months, at a salary of Rs. 200 per mensem.



Also that the Council had appointed Col. H. Hyde, R. E., a Trustee of the Indian Museum on the part of the Society in place of Mr. W. S. Atkinson, resigned.

The President laid before the meeting the following report of the Stoliczka Memorial Committee, and stated that on the recommendation of the Committee steps had been taken to procure a bust of the late Dr. F. Stoliczka, but the Committee hoped to obtain a portrait also if funds permitted.

### STOLICZKA MEMORIAL FUND.

The Stoliczka Memorial Fund Committee think it desirable to furnish the subscribers with information as to what has been done regarding the memorial in Calcutta and London.

The subscriptions to the Stoliczka Fund, collected and promised in India up to the 31st December, 1874, amounted to Rs. 1,670, according to the first list issued by the Committee. The subscriptions up to date amount to Rs. 1,908. In October last, a Branch Committee was formed in London, regarding which Dr. F. Day writes as follows:—

“A meeting was held on October 16th, in the rooms of the Zoological Society, 11, Hanover Square, to take into consideration the most appropriate mode of raising a memorial to the late Dr. Ferdinand Stoliczka.

“General Strachey, R. E., F. R. S., having been voted into the chair and the circular of the Stoliczka Memorial Committee having been read, it was resolved—

“That this meeting desirous of cooperating with the Committee formed in Calcutta for the procuring of some permanent memorial of the late Dr. Ferdinand Stoliczka, requests

General R. Strachey,  
Arthur Grote, Esq.,  
Dr. Day,  
Dr. Dobson,  
H. F. Blanford, Esq.

to act as a Committee to make arrangements for the collection of subscriptions and to superintend the preparation of such memorial as may be decided upon in communication with the Calcutta Committee.

“That Arthur Grote, Esq., be requested to act as Honorary Treasurer to the Fund and Dr. Day be requested to act as Honorary Secretary.

“That a circular be sent to persons likely to be interested in the object in view, informing them of the steps which have been taken and soliciting their subscriptions.

"The following sums have been promised prior to the despatch of the circular—

General Strachey,.....	£10
T. Oldham, Esq., L.L. D., .....	10
F. Drew, Esq.,.....	2
Dr. G. Dobson,.....	3
E. Alstone, Esq., .....	2
H. F. Blanford, Esq., .....	5
W. T. Blanford, Esq., .....	5
Dr. F. Day, .....	10
Major Godwin-Austen,.....	5
Surgeon-Major W. H. Rean, .....	5
The total amount hitherto subscribed amounts therefore to Rs. 2,478.	

The charges against the Fund are as follows :—

Printing, Postage, &c., .....	Rs.	68	9	0
Exchange on Rs. 1,892, say, .....	„	189	0	0
Total Rs...		2,204	7	0

With regard to the shape which the Testimonial should take, most of the subscribers in India, and the Committee itself, believed that the existing photographs of the late Dr. Stoliczka were too little varied to furnish materials for a bust, and it was thought that a portrait for the Meeting Room of the Asiatic Society of Bengal would, under these circumstances, be the most appropriate Memorial. The Committee also adopted the suggestion made by Mr. H. B. Medlicott to devote any surplus balance to the erection of a memorial tablet in Dr. Stoliczka's birthplace. The English Committee, however, appear to possess sufficient materials for a bust, as will be seen from the following extract from another letter by Dr. Day—

"All Subscribers were agreed that a bust to be presented to the Asiatic Society of Bengal would be the most fitting memorial to Dr. Stoliczka's memory, for which purpose we possess sufficient photographs in the opinion of an eminent sculptor.\* The cost of a bust and pedestal, carriage to Calcutta, &c., will amount to probably £200.

At a meeting of the Indian Committee held on the 17th May, it was decided that a bust would be the most suitable form of memorial; but that, if possible, a portrait should also be obtained, and it was resolved—

"That the Committee of the Stoliczka Memorial Fund in India feel greatly indebted to the Committee in London for their hearty cooperation in the procuring of a memorial to the late Dr. Stoliczka. The sum already

\* Mr. Timothy Butler, the artist who made Dr. Falconer's bust from photographs.

subscribed amounts to more than £200, and the Committee therefore solicit the Committee in London to make arrangements with Mr. Butler for an early commencement of a bust of the late Dr. Stoliczka. They would also request to be informed of the proceedings in London, and of the amount subscribed from time to time.

"As the Committee in India are very anxious to obtain also a portrait of the late Dr. Stoliczka should funds permit, they will communicate from time to time any additional subscriptions obtained in this country."

It was further resolved that a circular should be addressed to the members of the Society and to others interested in the matter stating what the Committee had done and soliciting further aid and subscriptions, from those members who have not already subscribed, to enable them to carry out their object in the manner proposed.\*

*List of Subscribers to the Stoliczka Memorial Fund, in India.*

Dr. J. Baxter, .....	Rs.	10	0	0
Col. C. B. Mainwaring, .....		10	0	0
Dr. J. Wise, .....		16	0	0
Syed Ahmed, ... ..		20	0	0
Dr. S. B. Partridge, .....		50	0	0
Dr. W. J. Palmer, .....		16	0	0
Col. J. T. Walker, R. E. ....		16	0	0
Col. R. MacLagan, R. E. ....		10	0	0
S. Kurz, Esq. ....		50	0	0
Babu Udoy Chand Dutt, .....		5	0	0
Munshi Newal Kishore, .....		5	0	0
Capt. J. Waterhouse, .....		20	0	0
M. L. Dames, Esq. ....		10	0	0
D. Waldie, Esq. ....		40	0	0
Hon'ble Raja Romanath Tagore, C. S. I., .....		50	0	0
Capt. W. F. Badgley, .....		32	0	0
Major J. W. H. Johnstone, .....		10	0	0
Dr. G. King, .....		16	0	0
V. Ball, Esq. ....		32	0	0
S. E. Peal, Esq. ....		50	0	0
A. V. Nursing Rao, Esq. ....		100	0	0

\* Since the above report was issued, the Committee have received intimation that the Austrian Government have voted the sum of £100 for the purpose of obtaining a bust of the late Dr. Stoliczka to be set up in the University at Vienna, and that it would be possible to have a copy of the bust for £70 or 80. They have therefore considered it desirable to countermand the order for the bust from England pending the receipt of a photograph of the Vienna bust, when they will be able to decide whether they will take the copy or order a new one from England.

W. Theobald, Esq. ....	Rs. 16 0 0
R. B. Foote, Esq. ....	10 0 0
H. B. Medlicott, Esq. ....	16 0 0
Capt. W. G. Hughes, ....	50 0 0
The Members of the German Club, Calcutta, ....	400 0 0
R. S. Brough, Esq. ....	20 0 0
E. H. Man, Esq. ....	10 0 0
Major G. E. Fryer, ....	50 0 0
Ganga Prasad, Esq. ....	10 0 0
A. B. Fisher, Esq. ....	25 0 0
J. M. Foster, Esq. ....	25 0 0
W. J. K. Wagentreiber, Esq. ....	10 0 0
Dr. R. A. Barker, ....	10 0 0
Dr. T. R. Lewis, ....	20 0 0
D. C. J. Ibbetson, Esq. ....	10 0 0
R. Chisholm, Esq. ....	40 0 0
Raja Joykishore Das, ....	20 0 0
Khawajah Ahsanullah, ....	50 0 0
W. E. Brooks, Esq., ....	20 0 0
Munshi Amir Ali, ....	20 0 0
Maharaja of Vizianagram, ....	100 0 0
A. Anderson, Esq. ....	20 0 0
Dr. D. D. Cunningham, ....	20 0 0
F. Schlegel, Esq., ....	20 0 0
L. Schwendler, Esq. ....	50 0 0
Col. H. Hyde, ....	100 0 0
Col. H. L. Thuillier, C. S. J., ....	16 0 0
Hon'ble E. C. Bayley, C. S. I., ....	50 0 0
Hon'ble Sir Richard Temple, K. C. S. I., ....	16 0 0
Right Revd. Dr. Milman, Lord Bishop of Calcutta, ....	50 0 0
J. Wood-Mason, Esq., ....	50 0 0
Capt. J. Biddulph, ....	16 0 0

Total subscribed in India to 30th April, 1875, Rs .. 1908 0 0

Total do. in England to 31st October, 1874, £57, ... 570 0 0

Total Rs. .. 2,478 0 0

Mr. Blochmann, at the request of Col. H. Hyde, exhibited a set of Bengal coins, one of which—a posthumous A'zam Sháhí of 812 A. H.—was exhibited by the Hon'ble Mr. E. C. Bayley in August last (*vide* also J. A. S. B., 1874, p. 294, note). The fact that these Bengal coins were

found in Northern Bihār, is an additional proof that Northern Bihār belonged to Bengal during the time that Southern Bihār belonged to the kingdom of Jaunpūr (J. A. S. B., 1873, Pt. I, p. 221). Mr. Bayley selected several for his own cabinet; of the twenty-six left, there were—

6 A'zam Shāhīs, of types published by Mr. Thomas in J. A. S. B. 1867, p. 69.

2 posthumous A'zam Shāhīs, dated 812.

18 Jalāluddīn Muhammad Shāhīs, of 818, 819, 822, 823, 826.

Col. Hyde kindly allowed the Society to select a few, and seven coins have thus been secured for the Society's cabinet, viz., 2 posthumous coins of A'zam Shāh, dated 812, and 5 Jalāluddīn Muhammad Shāhīs, dated 818, 819, 822, 823, 826.

Mr. Blochmann laid before the meeting several readings of Muhammadan inscriptions received from Capt. H. C. Marsh, 18th Bengal Cavalry, and Mr. T. W. Beale, A'grah. He said—

The readings sent by Capt. Marsh are from the Jāmi' Mosque in Sri'nagar, Kashmir. The first belongs to the Mosque itself; the other is from a *bdolī*, or well, opposite the principal entrance; and the third, a decree from the Emperor Shāh Jahān, is from the entrance of the mosque. The second and third inscriptions were published in the Journal of the Society for 1864 (p. 278) by the late Revd. I. Loewenthal.\* The first inscription, I find, is also given in the Persian history of Kashmir, entitled *Wāq'āt i Kashmir*, and written in A. H. 1148 by Muhammad A'zam, and in the Urdū translation of the work printed in 1846, at the suggestion of Dr. Sprenger, by Munshī Ashraf 'Alī of Dillī. The reading is (metre, long *hazaj*)—

نخستین مسجد جامع ز شه اسکندر ثانی • عمارت یافت و آنکه سوخت از تقدیر ربانی  
دگر باره حسن شد آنکه بود از نسل پاک او • بشد بانی این مسجد هم از توفیق یزدانی  
ولیکن از دو جانب نه ستون آراست نه سقفش • ز ابراهیم احمد ماکری شد راست تا دانی  
ز هجرت نه صد و نه بود تا دور محمد شاه • که این جنت سرا شد زینت دین مسلمانان  
بتاریخ هزار و بست و نه از هجرت سید • بروز عید روزه • موخته در نوبت ثانی  
ملک حیدر رئیس الملک در عهد جهانگیری • نهاد از نو بنایش باز روز عید قربانی  
چو تاریخ بنایش جست گفتا هاتف غیبی • نهاد از نو اسامش باز گاه عید قربانی

1. At first, the Jāmi' Mosque was built by Shāh Sikandar, the second [Alexander]; and according to God's decree, it burnt down.

\* In Mr. Loewenthal's *Bdolī* inscription, J. A. S. B., 1864, p. 286, we have to read *مینعش* for *منیعش* in l. 5; and *چشمه* for *سرچشمه* in l. 6. The *tarikā* has been wrongly added up; for the year in which Mahmūd built the well was 1152 A. H., or A. D. 1739, but not 1056 A. H.

2. Hasan Sháh, who belongs to his pure offspring, became, through God's grace, the second builder of the mosque.

3. But it had on both sides neither pillars nor a roof, which you know were only erected by [Sultán] Ibrahim Ahmad, of the Mákar tribe,

4. In the year 909, [A. D. 1503] up to the reign of Muhammad Sháh, when this paradisiac dwelling became the ornament of the Musalmán religion.

5. In 1029 [A. D. 1620] of the year of the Prophet's flight, on the day of the Great Feast, it was burnt down a second time, by day time,

6. And Malik Haidar, 'chief of the kingdom,' during the reign of Jahángir, built it up again on the day of the Feast of Sacrifice [9th Zil Hajjah].

7. When he [the poet] looked for the *tárikh* of its erection, a voice from heaven said—'Its foundation was again laid on the day of the Feast of Sacrifice.' A. H. 1029 [A. D. 1620].

A postscript to Capt. Marsh's reading states that the mosque was burnt down a third time during the reign of Aurangzib, in a great fire which laid half the town of Srínagar in ashes; but Aurangzib had it built up again, and his edifice still stands up to the present day.

From the *Wáqi'át i Kashmir* it is clear that religious quarrels between the Sunní, Shí'ah, and other sects, were the cause of the several conflagrations. Abul Fazl says in the *A'in* (my text edition, I, p. 563)—"There are bigoted Sunnís in Kashmir, and some Shí'áhs and Núrbakhshís, and enmity and strife exists among them." A well known proverb says—

دو گروه اند در جهان بی پیر و شیعه کشمیر

There are two sects in the world without guide, the Sunnís of Balkh and the Shí'áhs of Kashmir.

and another (*vide A'in* Translation I, 399)—'The Afgháns are the first the Kambús the second, the Kashmirís the third set of scoundrels in the world.'

The Malik Haidar, whose name occurs in the inscription, is mentioned several times in Jahángir's Memoirs and the histories of Kashmir. According to my MSS., he was zamindár of Chádúrah,\* which must lie in the neighbourhood of Púñch, S. W. of Srínagar. At his request, the name of the place was changed by Jahángir to 'Núr púr'. Malik Haidar was a protégé of Núr Jahán; she procured him a manáb, and the emperor bestowed upon him the title of 'Raís ul Mulk i Chaghtaiyah'. His brother, 'Alí Malik, cleared in the winter of A. H. 1029 the Púñch road for Jahángir. Haidar Malik was also a historian; but Muhammad A'zam does not attach much value to his history of Kashmir, because "he speaks more of his father and grandfather than of political events." He also says—"Malik Haidar of Chádurah, at the request of Núr Jahán, always accompanied the

\* Called in MSS. چادوره or چادری. S. Ahmad's edition of the Tuzuk (p. 304) has چادری.

emperor on his visits to Kashmir. Through her influence he obtained a *manṣab*, and was appointed to his birthplace, which belonged to his *zamín-dárá*. In Srinagar, he pushed on several works of public utility. He repaired the Lachmah Kol canal at the request of Malik Jalál uddín Thakúr's widow for the benefit of the great mosque and of the inhabitants of the neighbourhood who suffered from want of water. He also improved the Jadí Bil, which up to that time had lain waste, and rebuilt the shrine of the saint Shamsuddín of 'Iráq. The shrine had been built by Daulat Chak; but Haidar Malik's father, Hasan Malik son of Muhammad Malik, had burnt it from sectarian motives. This took place during the time when I'tiqád Khán was Jahángír's governor of Kashmir, a governor whose oppressiveness became proverbial." From the *Pádisháhnámah* (I, b., p. 52) we also see that Haidar Malik was in charge of the Sháhábád villa and gardens which Jahángír had built at Vernág.\*

#### A'grah.

Mr. T. W. Beale has sent readings of the following inscriptions. He writes—

"There is an old mosque still standing in Hing kí Mandí, opposite to the house called the house of Rájá Paṭnī Mal in A'grah—it was built in the time of Sháh 'A'lam Bahádúr Sháh, the son of 'A'lamgír, in 1123 A.H., by a Khwájahsará, named Yáqút Khán. It has the following inscription—

بسم الله بدور شاه عالم \* شه دین بادشاه هفت کشور  
بنای مسجد از یاقوت خان شد \* بخوبی از خط یاقوت خوشتر  
خود تاریخ بنیادش رقم زد \* چومصحف مسجد یاقوت بنگر

۱۱۲۳

1. To the praise of God, during the reign of Sháh 'A'lam, the king of the faith, the sovereign of the seven realms,

2. This mosque was built by Yáqút Khán. It surpasses in beauty the writing of Yáqút.†

3. Genius wrote down the date of its erection—'Behold the mosque of Yáqút (is in beauty) like a Qorán copy. A. H. 1123 [A. D. 1711].

"About the year 1850 A. D., near Sayyid Khán kí Mandí at A'grah, there was a shrine which had a large dome over it. It was sold by Government, and was knocked down and the bricks were taken away. In the foundation of the building a rupee of Jahángír's time, struck at A'grah in 1080 A. H., was found. This I bought from the purchaser of the shrine, and have it still in my possession, it contains the following verse (metre, *long hazaj*)—

\* *Vide* Ince, Kashmir Hand-book, p. 172. It is a curious coincidence that north of Púñch the maps give two places 'Alíábád and Haidarábád.

† In allusion to the famous calligraphist Yáqút of Baghdád. *Vide* Kin translation, I, pp. 99, 100.

ز نور سکه شاه جهانگیر ابن شاه اکبر \* بغرور دین زر آگره فروزان گشت چون اختر  
۱۰۳۰

From the light of the coinage of the emperor Jahāngir, son of the emperor Akbar, A'grah money became in Farwardin as plentiful as the stars. A. H. 1030 [A. D. 1620].

*The tomb of Sayyid Núrullah Shustarí.*

Sayyid Núrullah, a Shi'ah, was an inhabitant of Shustar in Persia, and came to India in the time of Akbar, who appointed him Qází of Láhor. In the reign of Jahāngir he was summoned to A'grah, where during a religious discussion, it is rumoured, he made some unpleasant remarks about Shaikh Salím Chishtí of Fathpúr Sikrí, to whose prayers Jahāngir believed to owe his existence. The emperor, in a great passion, ordered that his tongue be cut out from the back part of his neck, and his body be dragged by an elephant through the streets of the city. His tomb, which is of white marble, is on a high *chabútra* near the village of Nagla Padi, close to the Roman Catholic burial ground in A'grah. The inscription is—

مرقد منور سید نور الله شوستری  
ظالم کو از جفا نور الله \* قره العین نبی را سر برید  
سال قتل حضرتش ضامن علی \* گفت نور الله سید شهید  
سنه ۱۰۱۹ هجری  
بعهد جهانگیر بادشاه بسعادت شهادت فایز شدند سنه ۱۰۱۹ هجری

*The shining tomb of Sayyid Núrullah Shustarí.*

1. He was a tyrant who cruelly beheaded Núrullah, the beloved of the Prophet.

2. Zámín 'Alí found the year in which the saint was murdered in the words "Núrullah Sayyid has become a martyr". A. H. 1019 [A. D. 1610]. He obtained the blessing of martyrdom in the reign of Jahāngir, A. H. 1019.

Nawáb 'Alí Naqí Khán, the minister of the ex-king of Audh, came to A'grah in the latter part of A. D. 1871, and ordered a 'Dálán' to be erected over the grave. He died at Lak'hnaú in December of the same year; but the Dálán was finished in 1290, or A. D. 1873, as recorded on the following inscription over the entrance (*Rubá'í metre*)—

نوابه باغ مصطفی نور الله \* شاه ظالم شهید کردش ناگاه  
قرمود علی نقی مزارش تعمیر \* گشتند جمیع مومنینش همرا  
سال تعمیر این مبارک روضه \* جنات نعیم مرقد نور الله  
سنه ۱۲۹۰ هجری

1. Núrullah, a young sprout of the Prophet's garden, suffered martyrdom at the hand of a cruel emperor.

2. 'Alí Naqí ordered his tomb to be built up, and all the faithful joined him.

3. The *tarikh* of the erection of the sacred mausoleum lies in the words—"Sweet Paradise is the resting-place of Núrullah." A. H. 1290. [A. D. 1873.]



Regarding Núrullah, *vide* my *Áin* translation, I, p. 545.

Nur'abád, near Dholpúr.

*The Tomb of Ganná Begam.*

"Ganná Begam was celebrated for her personal accomplishments, as well as for the vivacity of her wit and the fire of her poetical genius. Several of her lyric compositions in the Urdú language are still sung and admired. She was the daughter of Nawáb 'Alí Qulí Khán, a mansabdar of 5000 horse, who was commonly called 'Chhangá' or 'Shash-angushtí', from his having six fingers on each hand. She was betrothed to Shujá'uddaulah, the son of Nawáb Safdar-jang of Audh, but afterwards married to Nawáb 'Imád-ul-mulk Gházíuddín Khán, prime minister of the emperor 'Álamgír II.; and this rivalry is said to have in part laid the foundation of the enmity which afterwards subsisted between that Wazír and Safdar-jang. Adjoining to the village of Núrábád near Dholpúr, two miles from Chhotá Sarái, is a pretty large garden, the work of the emperor Aurangzib 'Álamgír, built in the year 1100 A. H. (1688 A. D.), over the gate of which is an inscription bearing the chronogram of the year of its erection, (metre, *khafif*—the first miçra' is not metrical)—

کرد باغی بنا شاه عالمگیر • فیض بخش جهان چو مهر منیر  
بهر تاریخ او چو کرد سوال • گفت هائف که دیده باغ جمال

1100

"Within this garden is the monument of Ganná Begam. Her shrine bears the following inscription:—

آه غم گنا بیگم

Alas! a sigh for Ganná Begam!

"The inscription is a chronogram; hence she died in A. H. 1189, or A. D. 1775."

The poets Saudá and Mír Qamaruddin Minnat often corrected her verses. A poem by the latter was translated and published by Sir W. Jones in the 1st Volume of *Asiatic Researches*; but it is there wrongly ascribed to Ganná Begam. She wrote under the *nom-de-plume* of 'Manzar.' *Vide* also Sprenger, *Catalogue of Oudh MSS.*, p. 227; Garcin de Tassy, *Lit. Hind.*, I, p. 488.

'Ganná' means 'sugarcane ripe for cutting.'

Mr. Blochmann also read the following letter received from Mr. Beale on a Persian MS., entitled '*Imárát ul-Akbar*, which is the best work we possess on the buildings in Agrah from Akbar's time.

'About the year 1829-30, a student of the Agrah Government College, by the name of Munshí Chhítar Mal, a káyasth, by the orders of Doctor James

Duncan of A'grah, wrote a book entitled 'Imárat-ul-Akbar, عمارات الاكبر, on all the buildings of the reign of the emperor Akbar, wherein he gives a detailed account of the edifices which were then to be seen at A'grah.

'Although this book was written at the same time when Sil Chand wrote his *تفريغ العمارت*, I do not know, how Sil Chand's book was approved of by Government and made public, and that of the other man, rejected.

'It seems that Sil Chand had given the measurement of all the lands in A'grah in bighahs and biswas, which was the only thing Government wanted to know ; hence his work was approved.

'I am quite sure, the Asiatic Society has never seen the work written by Chhitar Mal. It is certainly a most valuable work, and the Society should keep a copy of it; and if it be translated by you into English, it would make a most splendid work.

'This book was fortunately brought to me by a friend and I now send it to you by book post, so that the Society may take a copy of it, and return it to me as soon as possible, as I myself wish to take a copy of the same, and return it to its owner.'

The following papers were read:—

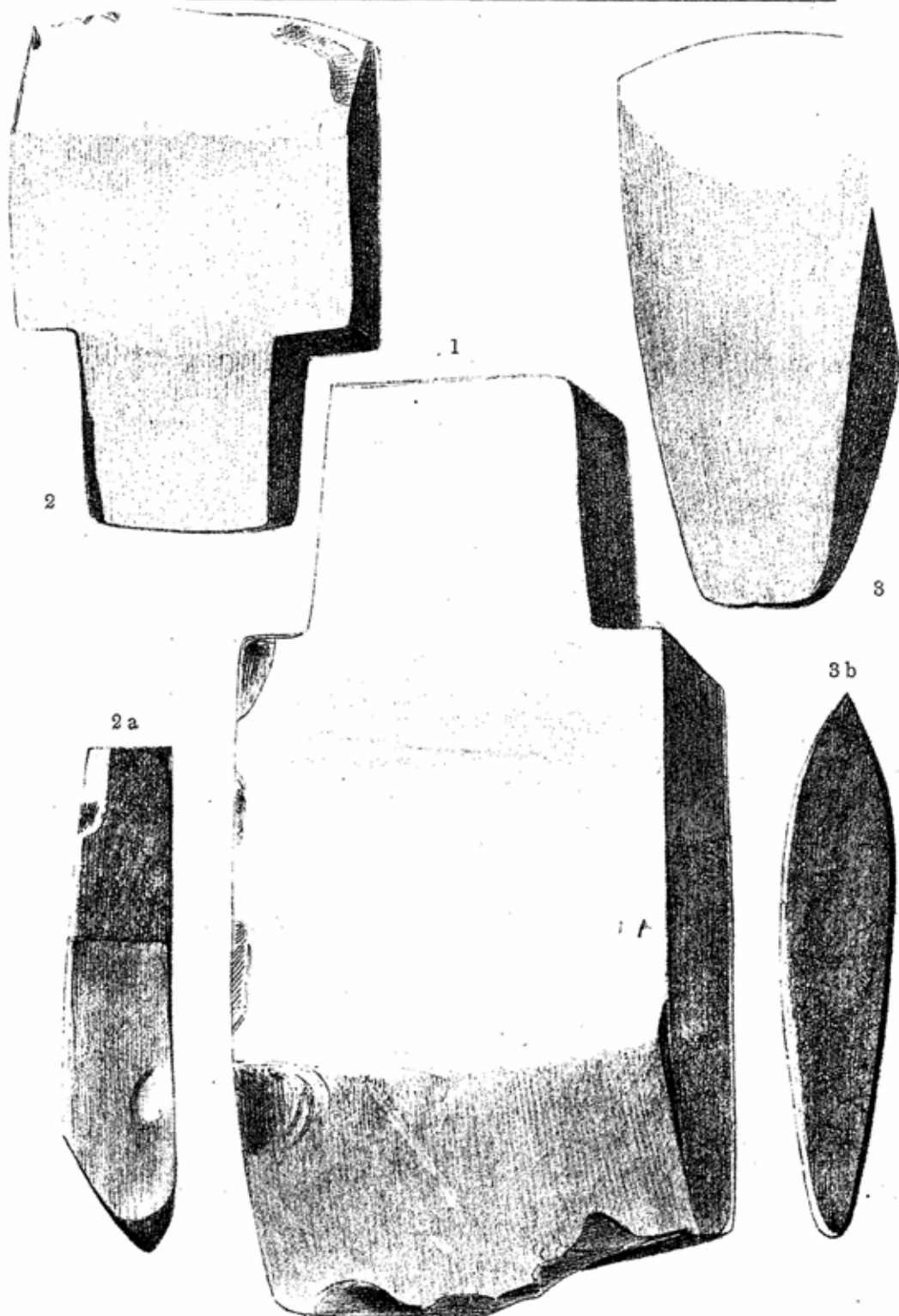
1. *On some Stone Implements of the Barmese type, found in Pargana Dalbhum; District of Singbhum, Chota-Nagpur Division.*—By V. BALL, M. A., F. G. S.

From time to time I have laid before the Society\* specimens of more or less well-formed stone implements from Chota Nagpur. With one exception these, whether flakes or of the chipped axe shape, would, I suppose, by those who employ the term, be classified as *palæolithic*. On the present occasion, however, I am enabled to exhibit some of a completely different character, one in fact, which in this part of the world at least, has been found to belong exclusively to the stone implements from Barmá and the adjoining countries.

The history of this discovery is as follows: When passing through the station of Chaibassa last November, Mr. Ritchie, the Superintendent of Police gave me the larger specimen and promised to get for me some others of which he had heard and also, as far as possible, to trace out the facts connected with their discovery. Subsequently, in January, he forwarded to me the two other implements and the following mythical account of their origin which he received from the natives.

The large adze was found "about two years ago by one Baidonath Perdan of the village of Kyma Pattra (on the west side of the Súbanriká river and not far from that river) in his sugarcane field embedded in the

\* P. A. S. B. 1865, p. 127; 1867, p. 143; 1868, p. 177; 1870, p. 268; 1874, p. 96.



STONE IMPLEMENTS FROM SINGHBHUM  
(natural size.)



earth about 3 feet or so from the surface. The *Perdan's* story is, that during the night preceding the finding of the implement, there had been a violent storm with thunder and much lightning, some of which flashed unpleasantly close to the village. That on going into his sugarcane field next morning he found the cane within a radius of 10 feet or so all burnt, singed and scorched up in a most surprising manner. He judged that the destruction had been caused by lightning, as no doubt it had. That his curiosity being excited by the crater-like appearance of the soil at the very centre of the circle of destroyed sugarcane he dug down with a view to ascertaining what might be there, and found the adze in a perfectly vertical position edge downwards. It was then in the same condition with broken edge as it is now.

The smaller adze has no particular history attached to it. It was obtained from a villager who could only say that his father—now dead—had found it somewhere in the jungle.

With regard to the wedge-shaped stone, Mr. Ritchie, on the authority of the Head Constable of Kokepara, states that "it was found by a man of Guru Banda (west side of Súbanriká) embedded in the very centre of the lower part of the trunk of a middling sized Mhowa tree (*Bassia latifolia*) which had evidently been struck by lightning and split in twain from top to the very lowest extremity of the trunk."

The popular notion according to Mr. Ritchie is that all these stones are thunderbolts. The same opinion is held by the people in Barma regarding the very similar implements found there.

The larger shouldered specimen (Pl. II, fig. 1) is formed of dark green, excessively dense and hard quartzite with a wavy structure and some included pebble-like masses of different composition. How far it may consist of pure quartz I cannot say as I have not chipped it and hardly like to do so. The other shouldered adze (fig. 2) is made of a black igneous rock, which shews a minute crystalline structure and can be readily scratched with a knife.

As regards the wedge-shaped stone (fig. 3) it has most mysteriously disappeared from my possession and I only retain a sketch of it; but so far as I remember, it appeared to be made of the same material as the larger adze.

In reference to the origin of these implements, their mineral composition is not, I believe, inconsistent with the view that they may have been manufactured originally in the part of the country where they were found. The source of the material from which the flakes I formerly exhibited to the Society were manufactured occurs within the district of Singhbhum. It is a bed of dark chert-like quartzite and from it the material of the large adze might very possibly have been obtained. Again the very numerous dykes

and intrusive masses of trappean rocks in Singbhum may contain a material identical with that from which the smaller adze was manufactured.

On the other hand the close resemblance in form which they bear to the implements of Barma cannot fail to suggest a foreign origin for them. Unfortunately the stories of their discovery given above do not help us in forming an opinion as to their antiquity. It would be of course useless to attempt any speculation, on the strength of such data alone, as to an incursion or immigration of Barmese races into that part of Bengal in Pre-historic times; but the fact now recorded may hereafter be of importance should evidence of another character tending in the same direction be by any means established.

Mr. Theobald remarked on the great interest of the discovery by Mr. Ball in India, of stone weapons of the peculiar Barmese type. Not only are the weapons identical, but it must be remarked that their reputed origin is identical also, as in Barma the belief is universal that these stones descend in the lightning flash and are found only where a flash has struck.

2. *Scientific names of the Markhor and Sind Ibex, with a note on that of the Indian antelope.*—By W. T. BLANFORD, F. R. S., F. G. S.

(Abstract.)

The writer remarks that new names have recently been suggested for the wild goat or "ibex" of Sind, and for the Sulimán variety of the Markhor.\* Both however have long been known to naturalists. The Sind ibex is identical with the wild goat of Persia and Western Asia, and was chiefly known in former times as the source of the genuine bezoar. The animal described as *Capra bezoartica* by various old writers and by Linnæus himself cannot, however, be recognized, as these writers confounded different antelopes with the wild goat, the proper name for which is *Capra ægagrus*.

The Sulimán Markhor is the *Capra megaceros* of Hutton, the Kashmir animal the *C. Falconeri* of Hügel, and if the two animals are the same, as most naturalists think, the latter name, which is the oldest, must be applied to them.

The name *Antilope bezoartica* applied to the Indian antelope by Blyth and Jerdon is incorrect. The true name is *Antilope cervicapra*.

Details of the synonymy are given in each case.

The paper will appear in the Journal, Pt. II, No. 1, 1875.

3. *On some recent evidence of the Variation of the Sun's Heat.*—By H. F. BLANFORD, Esq.

(Abstract.)

After referring to Messrs. Meldrum and Lockyer's discovery in 1872 of the apparent variation of the rainfall of the globe, coincidently with the

\* Proc. As. Soc. Bengal. 1874, p. 240.

number and extent of the spots on the sun's surface, and to Professor Köppen's discovery, published in 1873, that the temperature of the lower atmosphere in the tropics varies almost inversely as the number of the spots, he noticed the papers of Mr. Joseph Baxendell published, in 1867, some years before either of the above, in the *Memoirs of the Literary and Philosophical Society of Manchester*.

Mr. Baxendell had endeavoured to ascertain whether the sun's heat radiated to the earth underwent any periodical variation corresponding to the variation in the state of his surface, and, by an indirect but ingenious treatment of his data, had succeeded in showing that there was good reason for an affirmative conclusion. Then, remarking on the peculiar advantages for investigating all solar phenomena offered by India, and that it was very desirable that Mr. Baxendell's results should be confirmed by more direct evidence, he proceeded to give the results of the observed temperatures of the exposed black-bulb thermometer during the last seven years at Port Blair and ten stations in India. These observations showed an average rise of nearly six degrees in the temperature of the sun's radiation between 1868 and 1870, and a decline of about three degrees since 1872, 1867 having been the epoch of minimum spots and 1871 the maximum. This represented the effects of the sun on the land surface, and was probably only a fraction of the total variation at the limits of the atmosphere.

Comparing this result with that obtained by Professor Köppen, it followed that, as the heat of the sun increased, so the warmth of the lower stratum of air diminished, and *vice versa*,—a conclusion somewhat unexpected, and at first sight apparently anomalous. Mr. Blanford suggested that the explanation of this anomaly might perhaps be found in Messrs. Meldrum and Lockyer's law of the rainfall, supposing it to be fairly established. The Indian temperature records show that, both on short and long periods, the temperature of the lower atmosphere bears a certain inverse ratio to the rainfall, and it was easy to assign physical reasons for this observed fact, since, *cæteris paribus*, the more frequent the rainfall, the greater must be the quantity of cloud which intercepts the direct solar rays, and the greater the evaporation from the earth's surface, which also has a great cooling effect. Since the greater part of the earth is covered with water, the chief effect of increased radiation from the sun will be to increase the evaporation; therefore, as the subsequent effect, the quantity of cloud and the fall of rain; which is Messrs. Meldrum and Lockyer's result. The heat set free by the condensed vapour must doubtless raise the temperature of the upper strata of the air, those *viz.*, in which cloud is formed, but the lower strata will be affected in the opposite manner, which is the result obtained by Professor Köppen.

He concluded by pointing out the vast importance of the fact, once

established, that the sun's heat varies from year to year. The variation would seem to be so considerable, that it must have an appreciable effect on all terrestrial phenomena, (meteorology of course included,) for the sun's heat is well known to be the source of nearly all life and activity of every kind on the earth's surface. The variation in the absolute quantity of heat can be ascertained only from direct actinometric observations; and it is to be hoped that these will be undertaken before long at the new sun observatory to be established at Simla under Colonel Tennant.

The paper will appear in the *Journal*, Pt. II, No. 1, 1875.

Mr. W. G. Willson said, that no more interesting subject of investigation at the present time could have been selected by Mr. Blanford than the connection between variations of solar heat and the changes in the sun-spot area. This seemed to be the link required to establish, on a physical basis, Mr. Meldrum's law of connection between sun-spots and cyclones, as well as rainfall. Mr. Norman Lockyer appeared to consider a rainfall periodicity corresponding to that of the sun-spot area as fully established: (*Nature*, 12th December, 1872). He says that we "should no longer deceive ourselves as to the present state of meteorology. A most important cycle has been discovered analogous in some respects to the saros discovered by the astronomers of old." But it appeared to Mr. Willson that Mr. Meldrum, who first drew attention to the subject, and who subsequently examined tables of rainfall for 93 stations in various parts of the world; and Professor Brocklesby who had examined for the same purpose tables for 2,200 stations in America, were not equally sanguine. On the whole however they appeared to think that, amid striking anomalies, there was some evidence in favour of the supposed connection between rainfall and sun-spots. Mr. Willson had examined, in August last, tolerably extensive statistics of rainfall for a few stations, with the view of testing the supposed law. He had data for 10 maxima and minima sun-spot periods for Madras. For Bombay 8, for Calcutta 7, for Nágpur 4, for Greenwich 7 and for Rome 5. These he had put together side by side with the data given by Mr. Norman Lockyer in his paper in *Nature* before referred to. These data were 3 maxima and minima sun-spot periods for Port Louis, 3 for Adelaide and 5 for the Cape. The result of the comparison was not on the whole favourable to Mr. Meldrum's supposed law. Counting up, for all the the stations and for all the periods, the cases which were favourable and those which were unfavourable to the supposed law, he found that they were almost exactly evenly balanced, and it was to be remembered that the data given by Mr. Lockyer, which were included, were all favourable. However although no regular rainfall periodicity could be detected for the new stations examined, the total rainfall in maxima sun-spot periods was, for most of them, somewhat greater than that



in the minima periods. In the case of Calcutta, however, the rainfall in the minima sun-spot years was greater than that in the maxima years, and such was also true for Rome. For Greenwich the totals were almost equal.

Assuming however a rainfall periodicity, corresponding to that of the sun-spot area, to be established, he thought it was quite conceivable, as pointed out by Mr. Blanford, that while the maximum temperature indicated by the solar radiation thermometer varied directly with the sun-spot area, the temperature of the air near the surface might vary in an inverse manner in certain localities. An examination of the records of mean annual temperature derived from hourly observations in Calcutta showed that no periodicity was apparent. The mean annual temperature had in fact been practically constant for the last twenty years.

The reading of the following paper was postponed.

Pali Studies, No. 1, by Major G. E. Fryer, Sandoway.

#### LIBRARY.

The following additions have been made to the Library since the Meeting held in May last.

#### *Presentations.*

••• Names of Donors in Capitals.

Proceedings of the Royal Society of London, January, 1875.—Vol. XXIII, No. 158.

*J. Norman Lockyer*—Remarks on a New Map of the Solar Spectrum.—*J. Tyndall*.—On Acoustic Reversibility. *W. H. Johnson*—On some remarkable Changes produced in Iron and Steel by the action of Hydrogen and Acids. *J. B. N. Hennessey*.—On the Atmospheric Lines of the Solar Spectrum, illustrated by a Map drawn on the same scale as that adopted by Kirchhoff.

#### ROYAL SOCIETY, LONDON.

Journal of the Royal Geological Society of Ireland, 1873-4. Vol. IV. Pt. I.

*J. E. Gore*.—Note on a bed of Fossiliferous "Kunkur" in the Punjab.

#### ROYAL GEOLOGICAL SOCIETY, IRELAND.

Journal of the Anthropological Institute of Great Britain and Ireland April and July, 1874. Vol. IV. No. I.

#### ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Proceedings of the Literary and Philosophical Society of Liverpool. Vol. 28, 1873-74.

*Baron L. Benas*—Semitic Legends. *Robert Gordon*.—"Inscription on Burmese Bell, Liverpool Museum."—Translation from the Pali and Burmese. *C. H. Stearn* and *G. H. Lee*.—On the Expansion of the E line of the Hydrogen Spectrum, with plates.

#### LITERARY AND PHILOSOPHICAL SOCIETY OF LIVERPOOL.

Transactions of the Royal Society of Edinburgh. Vol. 27, Pt. II  
1873-74.

ROYAL SOCIETY OF EDINBURGH.

Quarterly Journal of the Geological Society of London. Vol. XXXI.  
Pt. 1, No. 121, February, 1875.

GEOLOGICAL SOCIETY OF LONDON.

Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Januar, 1875.

Register für die Monatsberichte vom Jahre 1859 bis 1873.

THE ROYAL ACADEMY OF SCIENCES, BERLIN.

Journal Asiatique. Vols. IV and V, Nos. 80, 81, December and January, 1874-75.

ASIATIC SOCIETY OF PARIS.

Entomologische Zeitung, Nos. 1-3, January and March, 1874.

ENTOMOLOGICAL SOCIETY OF STETTIN.

Zeitschrift der Deutschen Morgenlandischen Gesellschaft. Vol. 28,  
Pt. II.

GERMAN ORIENTAL SOCIETY.

Philosophie und Theologie von Averroes, by M. J. Müller.

AUTHOR.

Indian and Australian Snake-Poisoning.

SURGEON-MAJOR J. EWART.

On the Nature and Physiological Action of the Crotalus-poison as compared with that of *Naja tripudeans* and other Indian Venomous Snakes.

DR. FAYRER.

Uttara Rāma Charita, a Sanskrit drama, by Bhavabhūti, and Mālavikāgnimitra, a Sanskrit play, by Kālidāsa, translated by C. H. Tawney, M. A.

AUTHOR.

Professional Papers on Indian Engineering edited by Major A. M. Lang, R. E. Vol. IV. No. 16.

EDITOR.

The Fair at Sakhi Sarwar, by M. Macauliffe, Esq., B. A., C. S.

AUTHOR.

Synopsis of the Results of the operations of the Great Trigonometrical Survey of India, Vol. IV. 1875.

HOME DEPT. GOVT. OF INDIA.

Yajur Veda Sanhita, edited by Samāsram.

HOME DEPT. GOVT. OF INDIA.

Report on the Judicial Administration (civil) of the Central Provinces for 1874.

Report on the Judicial Administration (criminal) of the Central Provinces for 1874.

Report on the Police Administration of the Central Provinces for 1874.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report on the Administration of the Madras Presidency during the year 1873-74.

GOVT. OF MADRAS.

*Purchase.*

The Annals and Magazine of Natural History. Vol. XV. No. 87, March, 1875.

*H. N. Mosley.*—On *Pelagonemertes Rollestoni*. *Prof. Gray*—Do Varieties wear out or tend to wear out? *W. King*—Oceanic Sediments and their Relation to Geological Formations. *Gerard Krefft*—Remarks on Professor Owen's Arrangement of the Fossil Kangaroos. *M. Ussow*—Zoologico-Embryological Investigations. *Dr. B. N. Dybowski*—On the *Gammaridae* of Lake Baikal. *M. A. Gaudry*—On the discovery of true Batrachians in Palaeozoic Rocks.

The Numismatic Chronicle and Journal of the Numismatic Society, 1874. Pt. IV.

*E. T. Rogers.*—Notes on some of the Dynasty of the Khalifahs of Bani-Umeya.

The Ibis, a quarterly Journal of Ornithology, 3rd Series. Vol. V. No. 17, January 1875.

*J. H. Gurney.*—Notes on a Catalogue of the *Accipitres* in the British Museum, by R. Bowdler Sharpe (1874). *H. E. Dresser*—Notes on Severtzoff's "Fauna of Turkistan." *R. Swinhoe*—Ornithological Notes made at Chefoo (Province of Shantung, North China).

The American Journal of Science and Arts. No. 49. Vol IX. January 1875.

*E. Loomis.*—Results derived from an examination of the United States Weather Maps for 1872 and 1873. *John C. Draper*—Projection of the Fraunhofer Lines of Diffraction and Prismatic Spectra on a Screen. *C. S. Lyman*—On Venus as a Luminous Ring.

The London, Edinburgh, and Dublin, Philosophical Magazine and Journal of Science. Vol. 49, No. 324, March, 1875.

*E. Bouty.*—Studies on Magnetism. *F. Guthrie*—On Salt Solutions and Attached Water.

Journal of the Society of Arts. Nos. 1160 to 1163, Vol. XVII. February and March, 1875.

*Frederic Drew.*—The possibility of applying the Roman Alphabet generally to the Languages of India.—Silk Culture in Japan. Cacao cultivation in India. The Internal Trade of India. The Impracticability of adapting the Roman Character to the Alphabets of India.

The Academy.—Nos. 145 to 155. February, March, April, 1875.

The Doctrine of Descent and Darwinism, by Prof. O. Schmidt.

History of the Conflict between Religion and Science, by J. W. Draper, M. D.

Fungi, their Nature, Influence and Uses by M. C. Cooke, M. A., LL. D.

Animal Mechanism, a treatise on Terrestrial and Aerial Locomotion, by Prof. E. J. Marey.

Comptes Rendus Vol. 80, Nos. 5 to 8, February 1875.

No. 6. *M. Janssen*.—Lettre à M. Dumas, sur les résultats généraux de l'observation du passage de Vénus, au Japon. *M. d'Avout*.—Moyen facile d'obtenir sans instruments et avec une assez grande approximation la latitude d'un lieu.

No. 8. *M. J. B. Schnetzler*.—De l'action du borax dans la fermentation et la putrefaction. *M. Schützenberger*.—Sur la fermentation butyrique provoquée par les végétaux aquatiques immergés dans l'eau sucrée.

Journal des Savants. Janvier, 1875.

*M. E. Chevreul*.—Etude sur les quinquinas. A. de Quatrefages.—Etude sur les Todas.

Revue des deux Mondes. Vol. 7, Part IV. and Vol. 8, Part I. Février et Mars, 1875.

15. *Fev. M. E. de Valbezen*.—Les progrès matériels de l'Inde Anglaise—Les chemins de fer, le commerce et l'agriculture. *M. H. Blerzy*.—Etudes sur les travaux. Publics—Les rivières et les canaux de la France—La canalisation des rivières, les barrages mobiles et les réservoirs artificiels.

1er Mars. *M. H. Blerzy*. Etudes sur les travaux Publics.—Les rivières et les canaux de la France—L'avenir de nos voies navigables, les travaux à faire.—*M. Jules Patenôtre*.—Les Persans chez eux, notes de voyage—Recht, Cazbin, les routes et les villages.

Revue Archéologique. Nos. I. and II. Janvier et Février, 1875.

The Hindu Commentator. Vol. VII. Nos. 9 to 11.

#### *Exchange.*

The Athenæum. Pt. 564, February, 1875.

Nature. Vol. II. Nos. 283 to 286, April, 1875.

The Geographical Magazine. Vol. II. No. IV. April, 1875.

*Col. H. Yule*.—Trade routes to Western China. *Prof. A. Vambéry*.—A Journey from Samarkand to Shohri-sebz and Bokhara.

Transactions of the Asiatic Society of Japan. Vol. III. Pt. I. Octobre to December, 1874.

*Dr. Geerts*.—Useful Minerals and Metallurgy of the Japanese. *H. Gribble*.—The preparation of Vegetable Wax.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JULY, 1875.

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The Monthly General Meeting of the Society was held on Wednesday the 7th instant, at 9 o'clock P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:—

A medal from the Royal Norwegian University of Christiania.

From W. G. Willson, Esq., a copy of a Report on the Midnapur, Burdwan Cyclone of the 15th and 16th October, 1874.

From the Bengal Government a copy of Rig Veda-Sanhita, Part VI, edited by E. Max Müller, M. A.

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

C. Girdlestone, Esq., C. S.

Montgomery G. Stewart, Esq.

T. Black, Esq.

J. R. E. Gouldsbury, Esq.

The following are candidates for ballot at next meeting:—

C. J. O'Donnell, Esq., C. S., proposed by Mr. H. Blochmann, seconded by Captain Waterhouse.

J. F. Hewitt, Esq., C. S., proposed by Mr. H. B. Medlicott, seconded by Captain J. Waterhouse.

Lt.-Col. Minchin, Political Agent, Bháwalpur State, proposed by Mr. M. Macauliffe, Esq., C. S., seconded by Captain J. Waterhouse.

The following gentleman has intimated his desire to withdraw from the Society—

Rev. John Hector, Calcutta.

Letters were read:—

1. From Mr. H. B. Martin, Madhipúra, to Mr. H. Blochmann, regarding Buddhist Shrines—

“There are only two shrines in the Sub-Division which are known to have been made by Buddhists and no other, one is “Jamra Chandithán,” or Baróntpur, from which I sent the inscription, and “Rahta Chandithán” or, Bhawánipúr Rahta, about 25 miles apart; the latter has no inscription as far as one can learn.

2. From the Government of Bengal, forwarding for the information of the Society, the following report from Mr. Pratt, Joint-Magistrate of Maimansingh, on the recent destructive storm in the neighbourhood of Ishwarganj police station.

*Extract of a letter from MR. PRATT, Joint-Magistrate, to the Magistrate of Mymensingh, No. X, dated 6th April, 1875.*

Para. 1.—I have the honor to furnish the required report regarding the recent destructive storm in the neighbourhood of Ishwargunge police station.

2. I visited the scene on the 31st ultimo, and rode along the route which was taken by the storm. The direction was from north-west to south-east, beginning at Betandar and taking the following villages in succession:—Sálnákándá, Deopará, Bashbág, Danibiri, Chota Tárakándi, Bará Tárakándi, Káláliá, Bagárita (including the hamlet of Noapara), Boeráti, Bisunpur, Kálándar, Kullá, Khalbowlá, Moheshpur, Sarsha, Pánán, and Moheshátal.

3. Judging from the accounts given by the villagers, as well as the manner in which the trees had fallen (most lying to the south-east and the rest in all kinds of directions), it would appear that the storm was ushered in by a furious blast from north-west to south-east, which, after a few minutes, veered round from north to south, and, whirling round, at length passed on to the next village to the south-east. The havoc was done over an area of only about half a mile in breadth and extending to 5 or 6 miles in length, so that the storm-current could not have been one huge whirlwind, but rather a succession of smaller gyrations of air.

4. The real fury of the storm lasted only about a quarter of an hour, and it seems to have expended itself at Moheshátal in pergunnah Nusirujeal. Everything fell before the blast, a clean sweep being made of all the houses within the line, and thus it happened that while half a village remained intact, the other half was razed to the ground.

3. From the Secretary to the Government of Bengal (Financial Department) forwarding the following correspondence regarding samples of dye stuffs of Indian growth and of tusser and other silks, and enquiring whether the Society can favour the Government with the information called for.

No.  $\frac{1}{25}$ , dated Simla, the 3rd May, 1875.

*From A. O. HUME, Esq. C.B., Secretary to the Government of India, Department of Revenue, Agriculture, and Commerce.*

*To the Secretary to the Government of Bengal.*

I am directed to forward herewith copy of a despatch from the Secretary of State, No. 14, dated the 11th March, 1875, and of its enclosures, and to request that, with the permission of His Honor the Lieutenant-Governor, the necessary instructions may be issued for the collection of information on the various kinds of dye-stuffs of Indian growth and production, and specimens of working samples of dye-stuffs, as well as of the tusser and other wild silks.

2. I am to request that the information regarding dye-stuffs may be submitted in as complete a shape as possible, and that the samples may be carefully labelled, and full particulars supplied in regard to them.

3. I am to draw special attention to paragraph 4 of the despatch, relative to the manner in which the tusser silk, which is intended for the markets in Europe, should be reeled.

No. 14, dated India Office, London, the 11th March, 1875.

*From Her Majesty's Secretary of State for India,*

*To the Government of India.*

With reference to my despatch dated 23rd December (No. 69) 1874, I now transmit copy of a letter\* from Mr. Wardle, a silk dyer of great experience, and of one from Mr. Cobb, lately Honorary Secretary of the Silk Supply Association, on the subject of reeling and dyeing the tusser silk.

2. Mr. Wardle has discovered a way of dyeing tusser silk in brilliant colors and of giving it the lustre of Chinese silk; and he is willing to devote a portion of his time to continuing his experiments, and also to teach his process to natives of India.

3. I consider that advantage should be taken of this opportunity of improving a native product, the yield of which is stated to be practically inexhaustible, for Mr. Wardle thinks that the *moogah* and other wild silks are equally capable of improvement. With this object, I would suggest to your Excellency's Government that steps be taken to collect information on the various dye-stuffs of Indian growth and production, and that working samples of dye-stuffs as well as of the tusser and other wild silks, be collected and forwarded to this office in order that Mr. Wardle may be in a position to continue his experiments.

4. The recommendation of Mr. Cobb that the tusser silk should be reeled in skeins, instead of in hanks as at present is of great practical

\* Dated 1st February, 1875.

importance, and should be made known as widely as possible among those engaged in its production for the markets of Europe.

5. No replies have yet been received from Her Majesty's Consuls at Genoa, Lyons, Marseilles, and in Switzerland respecting the processes of reeling and dyeing silks, but I hope, at an early date, to be enabled to communicate them to your Excellency's Government.

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*Dyeing and Reeling Wild Silks.*

*From THOMAS WARDLE, Esq., F.G.S.,*

*To Her Majesty's Secretary of State for India.*

I duly received your Lordship's communication requesting me to report on the successful modes of dyeing the wild silks of India.

I have for several years been engaged in endeavouring to overcome the difficulties which, until recently, have surrounded the dyeing of these silks, and more particularly that of the tusser worm.

I think the natives of India may be taught to dye the silk.

They would require some acquaintance with our English chemical methods, which create and regulate affinities for the various tinctorial matters produced in their own and other countries, as well as with the particular processes I have found to succeed, and there would also be necessary the proper appliances for both dyeing and giving a lustre to this silk.

The processes which I have found successful are twofold: those which apply artificial colouring matter, and those in which some Indian or other exotic dye-stuffs are used.

India possesses a large number of dye-stuffs, many of which are practically unknown to English dyers, no doubt mainly owing to the absence of any descriptive work on the subject and the inaccessibility of the information to be derived from the Indian Museum.

Of the former, which are exclusively of English and Continental origin, chiefly derivations of coal-tar, I should give but a reserved recommendation. Their wholesale introduction into India would be almost sure to lower the high standard of Indian taste and decorative art power, and would probably counteract the demand which is rapidly rising at home for eastern dyed products. This much, however, may be said for these artificial dyes, that, owing to the natural brownness of colour of the tusser and other wild silks (which cannot at present be removed), much of the vulgar brightness of these dyes becomes neutralised when applied to these silks, and lower-toned and warmer shades are the result.

It is the application of the native dye-stuffs to the native silks that I would recommend. Besides the manifest economic advantages, there would be others of more importance from an artistic point of view.



To carry out this idea it would be necessary to know what dye-stuffs India produces, and then to investigate their nature and properties, with a view to their application to silk dyeing, and even to silk printing.

I may here be permitted to mention what I have long considered to be a national want, that of our not possessing a national dye-house, under able supervision, where such industrial applications as these could be systematically investigated and developed. France, in her Gobelins dye-house, under the scientific control of so eminent a man as M. Chevreul, possesses great advantages over us in maintaining superiority and supremacy in the silk trade; and yet in the possession of India, probably the largest dye-stuffs producing country in the world, we possess a natural superiority over all other countries, which it is only necessary we should duly cultivate to distance all competition.

The number of Indian dye-stuffs with which I am practically acquainted, such as indigo, madder, safflower, catechu, cochineal, and a few others, constitute only a small portion of those which India produces, and which, I think, might be very advantageously applied on the spot, if they were only made known here and their properties practically investigated.

Besides the meretricious results most of the anilin colors give, they have not the important merit of permanence. In both these respects, I think they would have to yield to native Indian dye-stuffs.

In addition to the silk of the tusser worm, there are others of a still wilder nature, such as some of those exhibited in the vertical cases in the Indian Museum, the names of which I at present forget. I have often thought these might be used in trade to the full extent of their production in textile fabrics, with and without cotton warps, and dyed or printed, or both, perhaps for coarse sewing silk, for cords, and for paper. That which would not admit of being reeled could be carded and spun into threads for weaving, as is the case now to such a large extent in Switzerland, and more lately in England, with the waste silk from the European silk manufacturers and from imported pierced cocoons.

I send samples of rough silk cloth, dyed and undyed, to illustrate my meaning. The silk of these fabrics is entirely from the mulberry worm, and takes the dye easily; it appears to be composed of the worst refuse of silk, almost the shoddy of "silk waste," after the more workable and regular portions have been separated for finer textile work. I think all the wild silks might and ought to be used similarly, if they can only be dyed or printed.

I also send a series of patterns of various dyes on tusser silk of a very inferior quality.

They may serve to point out what can be done in this direction.

If your Lordship is of opinion that I can aid in developing the new

and profitable industry to which your Lordship refers, I shall be glad to place my services at your Lordship's disposal, and would devote a portion of my time to the subject in the direction I have suggested.

For that purpose I should require as much information as is known to the authorities of the India Museum on the various dye-stuffs of Indian growth and production, with working samples of them, and also samples of the tusser and other wild silks, which I could have thrown and spun suitably for dyeing experiments.

I would endeavour to apply these dyes to the silks, and be prepared to teach the natives of India how to use them practically, as well as any or all those I at present understand.

I have derived very useful information from the India Museum on several occasions, and I take this opportunity of mentioning that its inaccessibility has prevented my using it as much as I should have done, and also prevents the public at large from almost knowing what a useful and instructive collection is there stowed away.

If it were placed in a more accessible situation, and amplified with a larger assortment of Indian products, the benefit to the trade of India would be greatly increased, and it would have a corresponding influence in elevating English taste and in helping English manufacturers to keep their old proper place in the world in the growing competition with other nations.

This is a matter demanding the attention of the highest statesmanship, particularly in regard to silk manufacture, which has, I am sorry to say, been on the gradual decline in this country for several years.

Dated London, the 1st February 1875.

*From* B. FRANCIS COBB, Esq.,

*To the Under-Secretary of State for India.*

In accordance with the request contained in your favour of 23rd December, I have placed myself in communication with some of the first dyers of silk in England and France with a view of furnishing you with the methods adopted in dyeing the tusser silk of India.

I regret to say the information I have to convey is very meagre for the following reasons:—

In the first place, the prevailing fashion is for the silk in its natural colour; secondly, the only dyes tried have been useful browns and whites; and, lastly, the general opinion in this country is that we cannot compete with the natives of India in the dyeing of tussers, especially in bright colours.

A more profitable industry would be to teach the natives to *reel* the tussers; for once imported into this country in the form of skeins, there

would be a market for any quantity. At present it is reeled in the form of small hanks, either upon a woman's knee or a rude conical hand-reel made of bamboo. The cocoons require to be steeped in more or less strong solutions of potash or caustic soda to dissolve the peculiar gum, this insect secretes while spinning.

The different tusser cocoons are produced in such abundance in different parts of India from the sub-Himalayan slopes to Ceylon, in which latter place Sir Emerson Tennant, in his "Natural History of Ceylon," describes no less than three descriptions of tussers of useful qualities, which have since been traced through the whole extent of the Nilghiris, again in the Assam districts, and again in Kangra.

No.  $\frac{2}{42}$ , dated Simla, the 25th May, 1875.

*From A. O. HUME, Esq., C.B., Secretary to the Govt. of India, Department of Revenue, Agriculture and Commerce.*

*To the Secretary to the Government of Bengal.*

In continuation of Circular No.  $\frac{1}{38}$ , dated the 3rd instant, asking that steps may be taken for the collection of information concerning dye-stuffs of Indian production, I am desired to request that particular attention may be paid to the collection, so far as may be practicable, of facts under the following heads:—

(1) Scientific and local vernacular names of the dye-stuffs produced in the province.

(2) Average approximate extent of cultivation annually in each district for the last five years.

(3) Cost and profits of cultivation.

(4) Season and methods of cultivation.

(5) Average estimated quantity of the dyes produced during the last five years.

(6) Proportion of the quantity produced which is absorbed locally and which is placed on the market. What are the principal markets to which the dyes are forwarded?

(7) Methods locally employed for extraction of the dye.

(8) Uses for which each dye is commonly locally employed, (viz. nature of fabric) and processes of application generally practised. Under this head should be given a full account of the mordants locally employed, and it should be stated what shades of colours are produced, by what combinations, and whether the colours are permanent or fleeting.

(9) Average price of each merchantable dye-stuff, according to quality, in the market.

(10) Total annual trade in each kind, stating the countries of import and export.

(11) To what extent is European capital employed in the production and manufacture of dyes, indigo and other.

2. In regard to dye-stuffs collected from forest trees, it is desirable that the Forest Department should supply the fullest particulars available.

3. His Excellency in Council also requests that attention may be directed to the subject of the competition of anilin dyes with dyes of local production. It should be stated how far this competition has been successful, what are the prospects of Indian dyes in Bengal, and whether any measures seem to be required for the encouragement of this branch of industry.

4. I am further to request that the fullest information available on the subject of tans of Indian production may also be furnished.

With reference to the above, the Council will be obliged if members of the Society possessing information on the subjects noted, will kindly communicate it for submission to the Bengal Government.

The President announced that as it had been found that advantage was not taken of the Library being open on Friday mornings, the practice would be discontinued as it caused extra expense.

Also that Dr. G. Thibaut, Anglo-Sanskrit Professor, Benares College, had been appointed a member of the Philological Committee.

Mr. W. T. Blanford exhibited some specimens of flint-cores and flakes from Sakhar and Rohri on the Indus, Sind, and gave the following account of them :—

Many years ago my attention was attracted to some very beautiful specimens of flint-cores from Sind in the collections belonging to the Bombay Branch of the Royal Asiatic Society. I subsequently often heard of similar worked flints being found in Sind. In the Geological Magazine for 1866, Plate XVI., three of these cores were very well figured from specimens procured by Lieut. Twemlow of the Royal Engineers and described (p. 433) by Mr. John Evans, who called attention to their beautiful regularity of form, and was inclined to ascribe them rather to the "neolithic" than to the "palæolithic" age. He compared them to the implements found by Messrs. Foote and King in the laterite beds of Southern India, and suggested that the material might prove to be rather a quartzite than a flint and consequently more thoroughly homogeneous than the chalk flints, for instance, from which implements were largely made in Western Europe. This however is a mistake caused naturally by the want on the specimens examined by Mr. Evans of any fracture sufficiently fresh to shew the texture. The Southern Indian implements are, so far as I have seen, generally of quartzite, and I have even met with a few of vein quartz, the Sind cores and flakes are of flint from the nummulitic limestone.

The most remarkable point about the cores found by Lieut. Twemlow was that they were stated to have been obtained three feet below the rock in the bed of the river. In a subsequent letter, (Geol. Mag. 1867, p. 43,) General Twemlow gave a section of the locality and explained that the specimens sent were from "a mass of flints, packed together, in layers of from one and a half to two feet in thickness," resting on limestone which proved to be true nummulitic limestone, full of *N. lævigata*, and covered by a recent silt deposit. Although this renders the matter rather simpler, because the cores were found above and not beneath the limestone, still the circumstance of their being found in the mass of flints is not clear. I may add that after examining the spot I have found the flints to be in place in the limestone, in which they occur as nodules, often of very large size, and forming in some cases imperfect and irregular bands in the strata, just as they do in the chalk of England.

I had occasion to visit Sakhar in the month of April last, and I naturally made enquiries about the cores occurring there. I then learned, chiefly from Mr. John Tate, C. E., that cores had been recently found both in the Indus Channel and on the hills around Rohri.

For the three cores now exhibited I am indebted to Mr. Tate, who was in charge of some rock excavations for the purpose of preventing the accumulation of silt at the mouth of the Sakhar canal. For this purpose a channel had to be cut in the limestone of which the river bank is composed at Sakhar, and in this limestone I am assured that the cores were found; and that in one case, at least, one was picked up immediately after some rock had been blasted, at a depth of at least two or three feet from the original surface of the limestone.

The rock, as already mentioned, is nummulitic limestone and unmistakeably of Eocene age. But an examination of this limestone shews that it is intersected in every direction by holes and crevices, many of them of considerable size, and there can, I think, be very little doubt that the cores have been derived from these crevices, which are usually filled with a mixture of gypsum and clay. Whether the worked flints have fallen into the crevices, or been washed in by the river, it is impossible to say; the cracks in question are for the most part horizontal or nearly so, but the cores are in no case that I have seen rounded, as if they had been transported for any distance by river action.

There can be very little doubt about the late age of these cores. They are by far the most carefully formed of any hitherto found in India, and are so far superior to all ordinary forms made of the same material, that, as was pointed out by Mr. Evans in the Geological Magazine, they rather resemble those of Obsidian which are found in Mexico and in some other places. The material of which they are formed is doubtless the flint which

abounds in the limestone of Rohri, and precisely resembles in form and mode of occurrence the flint of the English chalk.

On the hills around Rohri and Sakhar, cores and the flakes chipped from them abound in places, but all which I have seen are much more rudely formed than those obtained from the channel of the river Indus. A number are exhibited. Mr. Fedden noticed a peculiarity in many of the cores, which I do not recollect having seen before; this is that several of them, at the base, present the appearance of a flat surface ground by artificial means. The material is in all cases the nummulitic flint.

I am much disposed to believe that the cores found in the Indus were made by a different people from those who chipped their flakes on the hills around. This may be due to the more civilized flake-makers having established themselves on the river bank, whilst their less expert contemporaries roamed amongst the neighbouring hills or visited them for the purpose of obtaining a stock of cutting implements; or the former may have lived later, when the art of flint-chipping had been brought to greater perfection. There is a possibility that the best flints were selected and carried home to the dwellings on the bank of the river, in order that cutting flakes might be obtained from them by pressure, whilst less perfect materials were utilized and thrown away at once. However it may have happened, it is certain that all the specimens I have yet seen from the river bed are singularly well formed, shewing as a rule no trace of a flaw, and Mr. Tate informs me that, of a considerable number which he had seen, all were equally well fashioned, and although an occasional well shaped core may be found on the hills, the majority are broken or imperfect.

The President remarked that two or three of the specimens exhibited were the best samples of flint instruments he had ever seen.

Mr. Ball exhibited two specimens of Indian Boomerangs or throwing sticks, and made the following remarks regarding them:—

The objects exhibited and which, for want of another name, I call Boomerangs were received by me from Mr. H. P. LeMesurier of Bombay. On examination it appeared to me that they were different from my recollection of the Australian Boomerang, and I failed to make them shew any sign when thrown of its peculiar and well known property; though in throwing them I followed the instructions of a friend who had seen the true Boomerang used by Australians.

On writing to Mr. LeMesurier for further information he replied that they came from Kattiyawar and added—"They are used about Patri and Wudwan, B. B., and Cl. I. R. I can't make them come back. Possibly the original makers of all Boomerangs found out as the Kattiyawar folks

did that the shape was a handy one to shy, and only found out by accident afterwards that by some dodge in shaping they could be made to return."

Until yesterday I supposed that the use of such a weapon had not hitherto been recorded from any part of India, but on reading a paper on the Australian aborigines, in the *Journal of the Anthropological Institute*,\* I found that several of the members, including Sir John Lubbock and Col. Lane Fox, who took part in the discussion which followed the reading of the paper, were aware of a weapon similar in shape being used by some of the Hill-tribes of India who, however, used it to throw *directly* at an object, its principle being, therefore, different from that of the true Australian Boomerangs.†

The fact of the possession of such a weapon by certain Indian tribes was noted by the speakers as being interesting in connection with the view held by Professor Huxley on physical grounds as to a relation existing between Australians, Dravidians and Ancient Egyptians.‡ This view it would seem is also in some degree supported by philological considerations.

The best formed of these throwing sticks now in my possession is about 3 inches deep at the curve. One of the arms, is 15 inches long and the other 14½ inches. The angle included between the two arms is about 140°. The material is Babul (*Acacia arabica*). The other specimens are of different woods and of somewhat different shape, but are less highly finished and moreover cannot be thrown with the same degree of accuracy.

The following papers were read:—

1. *Pāli Studies*.—By MAJOR G. E. FRYER, *Deputy Commissioner, British Burma*. No. I. *On the Ceylon Grammarian Saṅgharakkhita Thera and his Treatise on Rhetoric*.

(Abstract.)

It was the practice amongst members of the early Buddhist church when entering the priesthood to discard their patronymic, and to adopt a priestly title, under which it was not always easy to recognize their identity. Thus it was with Saṅgharakkhita Thera, of whom nothing was known, except that he wrote the 'Vuttodaya' a brief treatise on Pāli prosody.

\* Vol. I, No. 1, 1871, p. 104.

† The use of these implements is thus alluded to by Lt.-Col. Gordon-Cumming. Many of these men (Guzerat Kolis) carried boomerangs, a weapon I have never seen used in any other part of India. It was made of a dark heavy wood two inches broad three quarters of an inch thick and about two and a half feet long sharpened at the edges. These they threw with great force and would not unfrequently knock over hares and partridges as they rose during the beat." *Wild Men and Wild Beasts*, p. 96.

‡ A similar weapon is said to be figured on some ancient Egyptian monuments.

This paper establishes his identity with a well known Pāli Grammarian, who flourished in Ceylon in the twelfth century, and who, under his priestly title of Saṅgharakkhita, wrote four works, the first of which, "Subodhālakāra," Easy Rhetoric, is the subject of the present sketch.

Major Fryer's analysis and the text of the work will appear in No. II, of Part I, of the Journal for 1875.

2. *List of Rare Muhammadan Coins.*—No. I. *Coins of the Kings of Dihlī and Jaunpūr.*—By J. G. DELMERICK, Dihlī.

(Abstract.)

Mr. Delmerick describes in this paper thirteen coins of the following kings—Balban (1); Mubārak Shāh (2); Tughluq Shāh (1); Mahmūd Shāh bin Muhammad Shāh bin Firūz Shāh (1); Nāṣiruddīn Abul Mujāhid Mahmūd Shāh, of Jaunpūr, 847 A. H. (1); Tājuddīn Abul Muzaffar Murād-Bakhsh Shāh, 1068; Shāhjahan (2); Aurangzib (1); Rafī'uddarajāt (1); Rafī'uddaulah (1); Muhammad Ibrāhīm, 1132 A. H. (1). With the exception of one Jaunpūr coin, they all belong to Dihlī. Six coins are gold; the others are silver.

The paper, with a plate, will appear in No. II of Part I of the Journal.

3. *Note on the Molluscan genera Cælostele, Benson and Francesia, Paladilhe, and on some species of Land Shells from Aden.* By W. T. BLANFORD, F. R. S.

(Abstract.)

It was shewn that a shell described from Aden by M. Paladilhe as *Francesia scalaris* was different from the Indian species called at first *Carychium scalare* by Mr. Benson, and subsequently described by him as *Coilostele* (properly *Cælostele*) *scalaris*, that this description had been overlooked by M. Paladilhe, and that the genera *Cælostele* and *Francesia* were probably identical. Some other species described from Aden were also discussed and in some cases shewn to be identical with known Indian mollusca.

4. *Translation of the 'Ayodhyā Māhātmya' or 'Pilgrimage to Ayodhyā.'*—By RA'M NA'RA'YAN, Bareilly College.

(Abstract.)

This is a translation of a Hindī work on the sacred spots with which the site of ancient Ayodhyā abounds. The legendary origin is given of the city itself, the river Sarayū (Sarjū), the birthplace of Rāma, the Manīparbat, Svargadvār, and many others. The narrative is thrown in the form of a dialogue between Mahādeva and Pārvatī. The Hindī work appears to be modern; for it contains allusions to Muhammadans.



The translation will appear in No. II of Part I of this year's Journal. Four photographs forwarded by the author were also exhibited, *viz.*, views of the Mosque which Aurangzib built upon Ráma's birthplace, of the Maníparbat, Svargadvár, and of an old Mosque in Faizábád.

5. *Notes on the Geology of part of the Daffla Hills, Assam; lately visited by the Force under Brigadier-General Stafford, C. B.—By MAJOR H. H. GODWIN-AUSTEN.*

(Abstract.)

The most interesting and important portion of this paper is that in which certain beds on the Dikrang river are described and considered to be the representatives of the Damúda Series recently worked out along the base of the Darjiling and Western Bhután mountains by Mr. F. R. Mallet of the Geological Survey of India and first brought to notice by Dr. J. D. Hooker as long ago as 1849. The section in question included a thick seam of black carbonaceous matter 5 to 6 feet thick. This shale or rather crushed splintery coal is stated to have exactly the flakey structure described by Mr. Mallet and would probably have to be worked up into an artificial fuel. The maximum thickness of this Damúda Series is estimated at 1000 feet. The paper concludes with a description of the recent river-terraces at the junction of the Dikrang and the Tánir Júli, of the geological features of the Burroi Gorge, and of the alluvial deposits of the Bisnáth Plain, which last are considered to be of the same age as the clay plateau at Tezpur and in other parts of Assam.

The paper will be published in full in the Journal, Part II, No. 1, 1875, with a section through the part of the hills traversed.

Mr. Medlicott remarked upon the importance of Major Godwin-Austen's rediscovery of the Damuda rocks so far to the east. Mr. F. R. Mallet had traced them from Punkabari to near Dalingkot. For some distance beyond Daling the frontier keeps clear of the hills; and when Mr. Mallet again took up the section in the Western Duars, the Damudas do not appear; but on the same apparent horizon there occur rocks not seen to the West, among which a crystalline dolomite is prominent, forming very striking physical features. Mr. Mallet called this the Buxa series. Now it is remarkable that when the Damudas reappear to the east, these Buxa beds seem again to be wanting. Major Godwin-Austen could not have failed to notice them. The fact suggests the equivalence of those highly contrasting deposits.

The general relation of the Damudas to the contiguous rocks would seem to be the same in the Daffla country as in Sikkim; but Major Godwin-Austen's observations do not throw any special light upon the rather startling interpretation, Mr. Mallet had adopted for the Sikkim section: that the

apparent order of the ascending section must be the normal (original) order of superposition; whereby the partially metamorphosed Damuda rocks at the base are really older than the overlying Daling schists, and these again older than the Darjiling gneiss. Mr. Medicott remarked—that Mr. Mallet's description of a number of carefully observed river sections at the base of the Sikkim Himalaya seemed to compel to this conclusion; and that analogous sections in the N. W. Himalaya, had frequently suggested to himself similar conclusions: for instance, there can be no doubt that the thoroughly metamorphic mica, hornblende and garnetiferous schists forming the summit of the ridge at Simla are younger than the underlying slaty schists and flags. Again, the generally unmetamorphosed limestone and slaty rocks striking far up the gorges of the Sutlej and the Beas seem inevitably to underlie the gneiss of the intervening Jalori ridge. The argument against the adoption of this view is really a prepossession—a general rule which we are by no means entitled to apply rigorously, and against which independent arguments are not wanting. It has been shown experimentally that the hydro-metamorphism to which gneiss and even granite are due, is not after all such a very plutonic operation. Also, although when we meet gneiss extensively on the flat, we may be entitled to regard it as a fundamental rock—due to such hypogene action as would require every underlying rock to exhibit an equal degree of metamorphism—the conditions were quite different when we come to mountain regions. Here special forces had operated which might be quite adequate to these apparently anomalous results. One of the most recent and most elaborately supported theories of mountain-formation—that by Mr. Robert Mallet—offered a very direct explanation of this puzzling phenomenon: that when a great mass of strata was subjected to lateral compression those portions which by position or from texture were least capable of yielding by shrinkage or contortion, would have to bear the brunt of the pressure, and to undergo in some other form its effects, prominently by an extra development of internal heat.

6. *Note on the Manipúri Language.*—By G. H. DAMANT, C. S., Kachhár.

(Abstract.)

The Manipúri language belongs to the Lohitic languages, and is therefore allied to the languages of the tribes of the Burmese frontier. Mr. Damant has given in this paper paradigms of declensions of nouns and inflections of verbs. Of the written characters of the language, Mr. Damant gave a specimen in the Proceedings for January last.

The paper will be printed in No. II of Part I of the Journal.

7. *Descriptions of a new Subgenus of Cyclophorus, and of other new Land and Freshwater Shells of India and Burma.*—By W. THEOBALD.

This paper will appear in a forthcoming number of the Journal.

8. *Note on Mahásthán near Bagurá (Bogra), Eastern Bengal.*—By C. J. O'DONNELL, C. S.

(Abstract.)

The author has collected in this paper the legends which he heard at Mahásthán, a place famous in the earliest Hindú traditions of Eastern India, and also of interest in later times as a Muhammadan shrine of great sanctity. It lies seven miles north of Bagurá, and consists of a great mound of earth intermixed with old bricks. Branching out from it, north and west, are two great ramparts, which are continued round to form a quadrangular enclosure. The enclosure is conspicuously marked on Sheet 119 of the Indian Atlas.\* All round it are shrines, holy wells, and embankments connected with the name of Bhím, one of the Pándava brothers. The principal Muhammadan monument is the shrine of Hazrat Sháh Auliya.

The paper will be printed in No. II of Part I of the Journal.

9. *Contributions to the History and Geography of Bengal.* No. III. By H. BLOCHMANN, M. A., *Calcutta Madrasah.*

(Abstract.)

This short paper contains readings of two inscriptions discovered by Mr. E. V. Westmacott, C. S., in Dínájpúr and Sherpúr Murchah, and a description of eight valuable coins belonging to the reign of Mahmúd Sháh I. of Bengal. Four of the latter were also received from Mr. Westmacott, and the other four from Mr. C. J. O'Donnell, C. S. They were all found in Mahásthán, near Bagurá (Bogra). The chronology of the reign of Mahmúd Sháh, which was hitherto one of the most obscure periods of Bengal history, becomes gradually settled, coins and inscriptions having yielded the dates A. H. 846, 852, 858, 861, 862, 863.

Mr. Westmacott's Bárbak Sháh inscription appears to be of 865 A. H. The other inscription gives the name of Ghiyásuddín Abul Muzaffar Jalál Sháh, son of Muhammad Sháh Ghází, and the year 900. The year shews how unsatisfactory the chronology is of the Afghán period of Bengal History.

The paper will be published in No. III of Part I of the Journal.

10. *The Bárah Bhúyahs of Bengal.* No. II.—By DR. JAMES WISE.

(Abstract.)

This short note is a continuation of Dr. Wise's essay on the Bárah Bhúyahs, or Twelve Lords, of Bengal, published in last year's Journal (p.

\* Another extraordinary embankment is due south from Sherpúr Murchah (15 miles south of Bagurá). It extends for about 8 miles, when it turns at a right angle to the west for about sixteen miles. It is also marked on Sheet 119 of the Indian Atlas.

197). Dr. Wise has now had an opportunity in England to consult several rare works written in the 17th century, containing confirmatory references to the Bárah Bhúyahs and their position. The works are—R. P. Petri Jarici Thesaurus rerum Indicarum, Col. Agrippinæ, 1615; La Monde ou Description générale de ses quatres parties, by Pierre D'Avity, Seigneur de Montmartin, Paris, 1643, fol.; Itinerario de las Misiones que hizo el Padri F. Sébastien Manrique, Rome, 1649; and Dell' India Orientale, descrizione geografica et historica, del P. Abbate D. Clemente Tosi, Rome, 1669.

This paper will also be published in No. II, Part I of the Journal.

The reading of the following papers was postponed—

Observations on some Indian and Burmese species of Trionyx, with descriptions of two new species.—By W. Theobald.

Supposed Greek Sculpture at Mathura.—By F. S. Growse, C. S.

*Abstract of the Proceedings of the Committees appointed by the Councils of the Asiatic and Agri-Horticultural Societies for the consideration and furtherance of Mr. Schwendler's proposition for the establishment of a Zoological Garden in Calcutta.*

In 1867 Dr. Fayer drew the attention of the Society to the want of a Zoological Garden in Calcutta.

In 1873 Mr. Schwendler again brought the subject before a Special Meeting of the Council and Natural History Committee, held on the 15th March.

Mr. Schwendler's proposals were:—

1. That the capital for starting should be raised by *donations*.
2. That the annual expenses should be defrayed by—

- I. An Annual Grant from Government.
- II. From the Municipality of Calcutta, and
- III. Entrance fees.
- IV. Funds raised by establishing a Zoological Garden Society.
- V. Profits on an Import and Export trade in animals.

3. That the most suitable site would be the unoccupied ground round the Kidderpore School, on the north side of Tolly's Nullah, between the Alipore and Kidderpore Bridges.

The meeting recorded their opinion of the advantage that would result from the establishment of a Zoological Garden in Calcutta and appointed a Sub-Committee, to consider and report on the feasibility of Mr. Schwendler's or any other scheme which might promise a successful result. The members of the Sub-Committee were:

The Hon. Sir R. Couch.

„ E. C. Bayley, C. S. I.

Babu Devendra Mullick.

„ Rajendralala Mitra.

Dr. J. Ewart.

Dr. J. Anderson.

Col. Hyde, R. E.

Dr. Dobson.

Mr. L. Schwendler.

Captain Waterhouse.

On the invitation of the Sub-Committee, Mr. J. A. Crawford, President of the Agri-Horticultural Society, also joined the Sub-Committee.

The Sub-Committee reported that, with some modifications, Mr. Schwendler's scheme appeared feasible. They considered that the capital required, could best be raised by public subscriptions and recommended that a deputation should wait on His Honor the Lieutenant-Governor of Bengal to lay the scheme before him and ascertain the amount of support the Government of Bengal might be disposed to give to the project: they further recommended that after the views of the Lieutenant-Governor had been ascertained, a prospectus, with a subscription list, should be circulated to the public.

With regard to the permanent income, the Sub-Committee were of opinion that the current expenses might be met by grants from the Imperial and Local Governments, the Town and Suburban Municipalities, the Asiatic and Agri-Horticultural Societies. The income from the above sources was roughly estimated at Rs. 14,000. From entrance fees it was estimated the income might be Rs. 17,750, or more. From the formation of a Zoological Garden Society Rs. 9,100. Total income Rs. 40,850.

The Sub-Committee recognised the value of Mr. Schwendler's proposal for forming an Agency for the sale and exchange of animals, as another possible source of income. They also stated that the site of the proposed garden should be somewhere in the vicinity of the Circular Road between Sealdah and Park Street, and recommended that an endeavour should be made to obtain a grant from Government of the building and plot of ground now occupied by the Pauper Hospital which, it was understood at the time, would be given up.

In conclusion, the Sub-Committee reported that His Excellency the Viceroy. had expressed his readiness to take into consideration the question of transferring the collection of animals from the Barrackpore Park to the new garden, if successfully established; that Babu Rajendra Mullick had renewed his offer of a donation of Rs. 2000 towards the funds, besides gifts of animals from his own collections: and further that the Maharajah of

Vizianagram had expressed his readiness to subscribe and assist as a member of the General Committee when formed.

At a meeting of the Sub-Committee held on the 19th March, it was resolved that letters should be addressed to the Chairman of the Justices of the Peace for the Town of Calcutta and of the Suburban Municipality to ascertain whether they would be prepared to grant a sum, not exceeding Rs. 200 per mensem, for the maintenance of a Zoological Garden; and that a letter should be addressed to the Maharajah of Burdwan enquiring whether he was willing to renew his promise, made in 1867, of a donation of Rs. 80,000.

In reply, the Secretary to the Justices wrote, that after full consideration of the application they had resolved—That though they could not comply, they were prepared to consider the question of establishing a People's Park on a scheme being placed before them which they could legally support. The Vice-Chairman of the Suburban Municipality replied, that he was not in a position to promise support; and His Highness the Maharajah of Burdwan answered that though not sanguine of success, he would be glad to assist, should there be a fair chance of establishing the garden.

The Report of the Sub-Committee was submitted to the Council of the Asiatic Society at their meeting on the 27th March, and it was ordered to be printed and circulated for the information of the Council. It was also resolved, on the proposal of Col. Gastrell, that a copy of the Report should be sent to the Council of the Agri-Horticultural Society.

A meeting of the Councils of the two Societies was held on the 9th April, when part of the Report of the Sub-Committee was read, and it was resolved:—

1st.—That the scheme for forming a Zoological Garden is deserving of the utmost support, and in the opinion of the meeting, the site proposed by the Sub-Committee is the best that has been presented to their notice.

2nd.—That a deputation of

The Hon. Sir R. Couch, Kt.

The Hon. E. C. Bayley, C. S. I.

The Hon. Louis Jackson.

The President of the Asiatic Society.

„ Agri-Horticultural Society.

„ British Indian Association.

Babu Rajendralala Mitra.

L. Schwendler, Esq.

Dr. J. Anderson.

Capt. Waterhouse.

should wait on His Honor the Lieutenant-Governor of Bengal to place the scheme before him and to solicit the assistance of the Government of Bengal.

3rd.—That the Government of India, the Government of Bengal, the Municipality of the Town of Calcutta, the Suburban Municipality, the Asiatic and the Agri-Horticultural Societies be addressed and solicited to assist.

It was afterwards proposed that Mr. H. A. Cockerell, officiating Chairman of the Justices and the Hon. Sir R. Temple should be invited to join the deputation.

A deputation of the above named members and Dr. Stoliczka, (with the exception of Sir R. Temple), were favoured with an interview with the Lieut.-Governor on the 16th April. Sir R. Couch briefly explained the object of the deputation. The Lieut.-Governor, in reply, expressed his readiness to aid the scheme for a People's Park, provided he saw his way to its successful realization; but stated that it was very difficult to find a suitable site, ground near Calcutta being very scarce and dear. He declined to entertain any proposal to remove the Pauper and other Hospitals. Further he said that the surrender of the Kidderpore site depended on the surrender of the Orphan Asylum ground by the Military authorities, who did not appear to have been asked. He added that if that site could be obtained, he would perhaps be able to add a very little of the adjoining Government land.

There appearing no chance of obtaining the site of the Pauper Hospital, it became necessary to consider whether any other site could be found, and as it had been proposed at the meeting of the Justices that the large piece of ground in the northern part of the town, known as Rajah Bagan, should be laid out as a People's Park and that a portion of it should be made over to the Councils of the Asiatic and Agri-Horticultural Societies to form a Zoological Garden, Mr. Cockerell undertook to ascertain the cost of acquiring and laying out this piece of ground and wrote on the 29th April, that it would cost Rs. 12,000 to surround it with a wall 10 feet high and Rs. 20,000 to remove existing huts. As regards the laying out of the Park, he said it was difficult to form an exact estimate, but to lay out 200 beegahs of ground in the simplest manner would cost not less than Rs. 15,000. The first expenditure would therefore be, say Rs. 50,000; the ground rent would probably be Rs. 10,000 per annum and the expenses of malees, &c. say Rs. 200 a month. These estimates did not include the expenses of maintaining the zoological collection.

A special general meeting of the Councils of both Societies, the other members of the deputation and the Sub-Committee was held on the 8th May, to consider what further steps could be taken to advance the project and it was resolved :—

"That a meeting be convened at the Town Hall, to ascertain the public feeling on the subject and with a view to the formation of a large and influential Committee for the promotion of the scheme."

The meeting was ordered to be held on the 14th May, and it was resolved that Sir R. Couch should be asked to take the chair.

Sir R. Couch having expressed his unwillingness to preside at a public meeting, and it also being considered desirable to postpone the meeting till Mr. Cockerell could ascertain the terms on which the ground could be acquired, the meeting was not held on the day appointed.

On the 3rd June, Mr. Cockerell wrote that he had received the consent of the Sobha Bazar zemindars to give a permanent lease of Rajah Bagan, and that he had also ascertained from the Receiver of the High Court that there was no objection to the lease on his part. He stated that he proposed to lay the matter before the Justices, as soon as the Government subscription would be ascertained, and that he had hopes they would consent to pay the rent and taxes of the land, amounting to something over Rs. 11,000 a year. Further Mr. Cockerell expressed as his opinion that a public meeting at that time of the year would hardly answer, and that it might be as well to ascertain the measure of assistance to be looked for from Government before appealing to the public.

This letter was circulated to the members of the different Committees and the public meeting was postponed pending the receipt of further information. Mr. Cockerell has since been relieved of the duties of officiating Chairman of the Justices and nothing further appears to have been done by the Justices nor could much assistance have been expected from them for some time to come.

Sir Richard Temple has however determined on taking up the land lying on both sides of the road leading into Belvidere for this purpose and endeavours are being made for the Garden being ready in time to be opened by the Prince of Wales.\*

\* The above abstract has been prepared by Mr. J. O'Kinealy C. S. from the report drawn up by Capt. Waterhouse as Secretary to the Committees and is published by order of the Council for the information of Members. Ed.



## LIBRARY.

The following additions have been made to the Library since the meeting held in June last.

*Presentations.*

\* \* \* Names of donors in capitals.

Proceedings of the Royal Geographical Society. Vol. XIX, Nos. I to III, 1875.

No. II. *Warren*.—On the Reconnaissance of a New or partially known Country.

No. III. *Oxenham*.—The Inundations of the Yang-Tsze-Kiang.

## ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Minutes of Proceedings of the Institution of Civil Engineers. Vol. XXXIX., P. I., 1874-75.

*A. R. Binnie*.—The Nagpúr Waterworks; with observations on the Rainfall, the Flow from the ground, and Evaporation at Nagpur, and on the Fluctuation of Rainfall in India and in other places. *C. Stone*. The Implements employed, and the Stone Protection adopted in the Reconstruction of the Bridges on the Delhi Railway.

## INSTITUTION OF CIVIL ENGINEERS, LONDON.

Institution of Mechanical Engineers Proceedings for August and October, 1874.

## INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Journal of the Statistical Society. Vol. 38, p. I., 1875.

*H. Jeula*.—The Mercantile Navies of the World in the years 1870 and 1874 compared.

## STATISTICAL SOCIETY, LONDON.

Proceedings of the Royal Society. Vol. XXIII., Nos. 159 and 160.

No. 159. *W. B. Carpenter*.—Remarks on Professor Wyville Thomson's preliminary Notes on the Nature of the Sea-bottom, procured by the Soundings of H. M. S. "Challenger." *Prof. W. Thomson*. Report to the Hydrographer of the Admiralty on the cruise of H. M. S. "Challenger" from July to November, 1874. *J. B. N. Hennessey*. Some particulars of the Transit of Venus across the Sun, December 9th, 1874, observed on the Himalaya Mountains, at Mussoorie. Note No. 1. *J. B. N. Hennessey*. Appendix to note, dated November 1873, on White Lines in the Solar Spectrum. *T. Lauder Brunton and J. Fyfe*.—On the Nature and Physiological Action of the *Crotalus*-poison as compared with that of *Naja tripudians* and other Indian Venomous Snakes; also Investigations into the Nature of the Influence of *Naja* and *Crotalus*-Poison on Ciliary and Amoeboid Action, and on Vallisneria, and on the influence of Inspiration of Pure Oxygen on Poisoned Animals. *Prof. W. G. Adams*. On the forms of Equipotential Curves and Surfaces and Lines of Electric Force.

No. 160. *J. G. Buchanan*. On the Determination at Sea of the Specific Gravity of Sea-Water. *Capt. W. J. Heaviside, R. E.* Preliminary Abstract of Approximate Mean Results with the Invariable Pendulums Nos. 4 and 1841, in continuation of the Abstract published in Vol. XIX. of the Proceedings. *J. N. Lockyer and W. C. Roberts*.—

On the Absorption-Spectra of Metals volatilized by the Oxyhydrogen Flame. *W. C. Roberts*. On the Liqutation, Fusibility, and Density of certain Alloys of Silver and Copper. *Rev. A. E. Eaton*. First Report of the Naturalist attached to the Transit-of-Venus expedition to Kerguelen's Island. December, 1874.

ROYAL SOCIETY, LONDON.

Memoirs of the Royal Astronomical Society. Vol. 40, 1874-75.

A Catalogue of 10,300 Multiple and Double Stars arranged in the Order of Right Ascension.

ROYAL ASTRONOMICAL SOCIETY, LONDON.

Bulletin de la Société d'Anthropologie de Paris. Vols. 9 and 10 Fas. 4, 1874, and Fas. 1, 1875.

Fas. 4, 1874. *M. D'Abbadie*.—Discussion sur les instructions pour l'Asie Centrale.

Fas. 1, 1875. *Hamy*. La famille velue de Birmanie. *Mondières*. Renseignements ethnographiques sur la Cochinchine. *Morice*. Sur l'anthropologie de l'Indo-Chine.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Bulletin de la Société de Géographie, April, 1875.

GEOGRAPHICAL SOCIETY OF PARIS.

Records of the Geological Survey of India. Vol. VIII., P. 2, 1875.

*W. King*.—Preliminary note on the Gold-fields of South-east Wynad, Madras Presidency. *A. B. Wynne*. Geological notes on the Kharsian Hills in the Upper Punjab. *W. T. Blanford*. Report on Water-bearing strata of the Surat District. *H. B. Medlicott*. Sketch of the Geology of Scindia's territories.

Memoirs of the Geological Survey of India. Palæontologia Indica. Vols. 1, 3, 1875. Jurassic Fauna of Kutch, by Dr. W. Waagen.

SUPERINTENDENT GEOLOGICAL SURVEY.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin. Februar und März, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Minutes of the Annual General Meeting of the Trustees of the Indian Museum for the year 1874-75.

THE TRUSTEES OF THE INDIAN MUSEUM.

Verhandlungen der K. K. Zoologisch—Botanischen Gesellschaft in Wien. Vol. XXIV. 1874.

*Reichardt, H. W.*—Präparirte *Porphyra vulgaris* Ag. aus Japan. *E. Reitter*. Beitrag zur Kenntniss der Japanesischen *Cryptophagiden*. *Dybowsky, Dr. B.* Die Fische des Baical Wassersystemes.

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Oesterreichische Monatsschrift für den Orient. Nos. 5 and 6, 1875.

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Sitzungsberichte der K. C. Akademie der Wissenschafte zu München. Philosophisch-Philologischen und historischen Classe. Pts. I. III. IV, 1874. Mathematisch Physikalischen Classe, Pt. II., 1874.

Abhandlungen der Philosophisch-Philologischen Classe. 13 vol. Pt. 2, 1874.

Abhandlungen der Mathematisch-Physikalischen Classe. 11 vol. Pt. 3, 1874.

ROYAL BAVARIAN ACADEMY OF SCIENCES, MUNICH.

Conference on Urdu and Hindi Christian Literature held at Allahabad, 1875.

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Jahrbuch der K. Königlichen Geologischen Reichsanstalt. Vol. 24, 1874.

THE IMPERIAL GEOLOGICAL ACADEMY OF VIENNA.

Leopoldina, Pts. 7, 8, 9, 1871-73.

LEOPOLDINE CAROLINE GERMAN ACADEMY OF NATURAL PHILOSOPHY,  
DRESDEN.

Report on the Gaols of the Central Provinces for 1874.

Report on the working of the Registration Department in the Central Provinces for 1874-75.

Report, with Chief Commissioner's remarks, on the Stamp Revenue of the Central Provinces, for 1874-75.

CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Yajur Veda Sanhita, Pts. 6 and 7.

Report on the Revenue Survey Operations of the Lower Provinces from October 1873 to September 1874.

Rig Veda Sanhita, edited by F. Max Müller. Vol. VI.

GOVERNMENT OF BENGAL.

Statistical Reports of Norway.

Min Haerramek ja Baestamek Jesus Kristus odda Testamenta.

Grundtrøkkene den Ældste Norske Proces, by E. Hertzberg.

Die Aegyptischen Denkmäler in St. Petersburg, Helsingfors, Upsala und Copenhagen, by J. Lieblein.

ROYAL NORWEGIAN UNIVERSITY IN CHRISTIANIA.

Report on the Midnapore and Burdwan Cyclone of the 15th and 16th of October, 1874.

Report of the Meteorological Reporter to the Government of Bengal, 1874.

W. G. WILLSON, Esq.

Magnetische und Meteorologische Beobachtungen, 1873.

ROYAL OBSERVATORY OF PRAGUE.

Diwan Poëtae Abu-'l-Walid Moslim ibno'-l-Walid al-Ançari, by Prof. M. J. de Goeje.

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*Purchased.*

Quarterly Journal of Microscopical Science. New Series, Vol. LVIII, April, 1875.

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The Edinburgh Review, No. 288, April, 1875. The Geology of India.

Journal of the Society of Arts. Vol. XXIII., Nos. 1164 to 1172.

No. 1164. Indian Museum.

No. 1166. Tussah Silk-worm. The Cultivation of Opium and Cinchona in India. The Roman v. the Indian alphabets. Cacao Cultivation in India.

No. 1168. R. H. Elliott.—Measures and Suggestions for the Advancement of the Wet and Dry Cultivation in India. The Roman Alphabet for India.

No. 1170. J. Forbes Watson.—The Indian Museum Question. Scientific and Literary Societies in India.

No. 1171. J. Forbes Watson.—The Preparation and Uses of Rhea Fibre.

No. 1172. E. Helm.—The Growth of the Factory System in India, with especial reference to the Production of Textile Fabrics and the relative Advantages of the British and Indian Manufacturer.

The Westminster Review. New Series, No. XCIV, April, 1875.

IV. Our position in India.

The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science. Vol. 49, Nos. 325, 326, April and May, 1875.

No. 325. J. R. Capron.—On the Comparison of some Tube and other Spectra, with the Spectrum of the Aurora. C. Tomlinson. On the Action of Solids in Liberating Gas from Solution.

No. 326. M. E. Goldstein.—On Spectra of Gases. A. M. Mayer.—Researches in Acoustics. Prof. G. C. Foster.—On Graphical Methods of solving certain simple Electrical Problems. A. F. Weinholt. Introduction to Experimental Physics, Theoretical and Practical, including Directions for Constructing Physical Apparatus and for making Experiments. W. M. Watts. On the Spectrum of the Aurora. H. J. Puluj. On a Lecture-room Apparatus for the Determination of the Mechanical Equivalent of Heat.

The Annals and Magazine of Natural History. Vol. 15. Nos. 88 and 89, April and May 1875.

No. 88. Rev. O. P. Cambridge.—On a New Species of *Liphistius*, SCHRÖDTE. T. Gill. On the Geographical Distribution of Fishes. A. S. Packard, Jun.—On an undescribed Organ in *Limulus*, supposed to be Renal in its nature.

No. 89. R. v. Willemoes-Suhm.—Notes on some Young Stages of *Umbellularia*, and on its Geographical Distribution. M. Ussow.—Zoologico-Embryological Investigations. J. Wood-Mason.—Note on the Geographical Distribution of the *Temnocephala*.

*Chilensis* of BLANCHARD. Dr. Franz Low. *Tylenchus millefolii*, n. sp. a new gall-producing *Anguillulide*. A. M. Mayer. Experiments on the supposed Auditory Apparatus of the *Culex mosquito*. M. A. Schneider.—On an Apparatus of Dissemination of the *Gregarina* and the *Stylorhynchi*, and on a remarkable Phase of Sporulation in the latter Genus. Dr. A. B. Meyer. On the Habitat of *Peristethidion prionocephalum* Dum. Dimorphic Development and Alternation of Generations in the *Cladocera*. Action of Light on the Development of the Young of Frogs.

The Quarterly Review. No. 276, April, 1875.

II. Indian Missions, IX. England and Russia in the East.

The American Journal of Science and Arts. Vol. IX. Nos. 50, 51 and 52, 1875.

No. 50. A. E. Verrill.—The Gigantic Cephalopods of the North Atlantic.

No. 52. A. M. Mayer.—The History of Young's Discovery of his Theory of Colors. A Re-determination of the Constants of the Law connecting the Pitch of a Sound with the Duration of its Residual Sensation.

The Academy. Nos. 156 to 161, 1875.

The Quarterly Journal of Science. No. 146, April, 1875.

The Calcutta Review. No. 121, Vol. 71, July, 1875.

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Nos. 2 and 3. Delbrück.—Chrestomathie védique. Le verbe dans la langue Védique.

No. 5. De Gubernatis. Lectures sur la Mythologie Védique.

No. 10. Coomara Swamy.—Sutta Nipāta.

No. 11. Talboys Wheeler.—Histoire de l'Inde. Hurry Chund Chintamon. Commentaire sur la Bhagavad-Gita.

No. 12. Hodgson.—Essais Sur les langues la littérature et la religion du Nepal et du Tibet.

No. 15. Max Müller.—Rig-Veda-Sanhita, t. VI.

No. 16. Kern.—L'Aryabhatiya.

Revue et Magasin de Zoologie. No. 12, 1874. No. 1 and 2, 1875.

Revue Archéologique. Nos. III and IV, March and April, 1875.

Comptes Rendus. Vol. 80. No. 9 to 16, 1875.

No. 10. M. Mouchez.—Observation du passage de Vénus, à l'île Saint-Paul, Phénomènes optiques observés aux environs des contacts.

No. 11. M. Bouquet de la Grye.—Sur les documents scientifiques recueillis à l'île Campbell, par la Mission envoyée pour observer le passage de Vénus. M. José da Silva Mendes-Leal.—Ministre du Portugal, adresse à l'Académie une lettre originale de Manoel Godinho de Herpédia, indiquant la découverte de l'Australie par les Portugais M. Langley. Sur la température relative des diverses régions du Soleil. Première partie: Les noyaux noirs des taches.

No. 12. M. Fordos.—De l'essai des étamages contenant du plomb; procédé d'essai rapide. M. Langley.—Sur la température relative des diverses régions du soleil. Deuxième partie. Région équatoriale et régions polaires.

No. 13. M. Andral.—Documents pour servir à l'histoire de la glycosurie. M. E. Gripon.—Propriétés physiques des lames de collodion. M. H. Pestin. Théorie des tempêtes. Réponse à M. Faye. M. H. Hildebrandsson.—Des courants supérieurs de l'atmosphère dans leurs relations avec les lignes isobariques.

No. 14. *M. Faye*. Résultats des observations faites en Suède sur les courants supérieurs de l'atmosphère. *M. Ch. Sainte-Claire Deville*.—Sur les variations ou inégalités périodiques de la température (11<sup>e</sup> Note); période du vingtième jour dodécuple Novembre. *M. Sédillot*. Rapport sur un mémoire de M. J. Hennequin intitulé "De l'allongement du fémur dans le traitement de ses fractures." *MM. Musculus et de Mermé*. Sur un nouveau corps qu'on trouve dans l'urine après l'ingestion d'hydrate de chloral.

No. 15. *M. Daubrée*.—Chute de poussière observée sur une partie de la Suède et de la Norvège, dans la nuit du 29 au 30 Mars, 1875 d'après des communications de *MM. Nordenskiöld et Kjerulf*. *M. E.-J. Maumend*.—Note sur les bronzes du Japon. *M. A. Béchamp*. Du rôle des microzymas dans la fermentation acide alcoolique et acétique des oeufs. Réponse à M. Gayon.

No. 16. *M. Berthelot*.—Sur la reconnaissance de l'alcool ordinaire mélangé avec l'esprit-de bois. *M. Feré de Lesseps*. Sur les méthodes à employer pour le maintien des ports. *MM. Alf. Riche et Ch. Brady*. Recherche et dosage de l'alcool méthylique en présence de l'alcool vinique. *M. Woillez*. Sur le spiroscope, appareil destiné à l'étude de l'auscultation, de l'anatomie et de la physiologie du poulmon. *MM. G. Hayem et A. Nachet*. Sur un nouveau procédé pour compter les globules du sang. *M. Couste*. Note sur la theorie des tempêtes. Réponse à M. Faye.

Journal des Savants. Febr. Mars. 1875.

Revue de Philologie et D'Ethnographie. Vol. 1. No. 3, 1875.

No. 3. *S. Blondel*.—Le Jade, étude historique archeologique et littéraire sur la pierre appelée Yu par les Chinois. *P. Hunfalvy*. Essai d'une Grammaire Ostiaks. *M. Grünwald*. Grammaire Samoïede. I. les sons. II. phonétisme. III. l'harmonie des voyelles. IV. changement des voyelles.

Göttingische gelehrte Anzeigen. Nos. 1 to 16, 1875.

Revue des Deux Mondes. Vols. 8 and 9, March, April and May, 1875,

*M. C. Martins*.—Recherches récentes sur les Glaciers actuels et la période glaciaire.

Poggendorff's Annalen der Physik und Chemie. Vol. 154, Nos. 3 and 4, 1875.

No. 3. *J. L. Hoorweg*.—Ueber den Gang der Lichtstrahlen durch ein Spectroskop.

No. 4. *H. Helmholtz*.—Zur Theorie der anomalen Dispersion. *A. Topler*. Zur experimentellen Bestimmung des Diamagnetismus dur seine Inductionswirkung. *A. W. Wright*. Ueber das Spectrum des Zodiacallichts. *K. A. Holmgren*. Einige Bemerkungen zu dem Thomson'schen Elektrometer.

Jahresbericht über die Fortschritte der Chemie. Pt. 1, 1873.

Grammatik der Lebenden Persischen Sprache von H. L. Fleischer.

Die Griechischen Personennamen nach ihrer Bildung erklärt, mit den Namensystemen verwandter Sprachen verglichen und systematisch geordnet von Dr. A. Fick.

L'Ancien Orient; Etudes Historiques, Religieuses et Philosophiques sur L'Egypte, La Chine. L'Inde, La Perse, La Chaldée et la Palestine depuis les temps les plus reculés, par Léon Carre. (Vols. I and II).

Flora Indica; or Descriptions of Indian Plants, by the late Dr. W. Roxburgh.

The Descent of Man, and Selection in Relation to Sex, and The Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life by C. Darwin.

The Book of Sér Marco Polo, the Venetian, Concerning the Kingdoms and Marvels of the East. 2nd Edition, vols. I and II., and Cathay and the way Thither, by Col. H. Yule.

An Icelandic-English Dictionary based on the MS. collections of the late R. Cleasby enlarged and completed by G. Vigfusson.

The Zoological Record for 1871 and 1872, vols. VIII. IX. edited by A. Newton.

A Map of Central Asia, prepared from the most recent Russian and English researches by the Royal Geographical Institute of Vienna, 1874.

#### *Exchange.*

The Geographical Magazine, Vol. II. Nos. 5 and 6, 1875.

No. 5. *Clements R. Markham*.—Travels in Great Tibet and Trade Routes between Tibet and Bengal. *Augustus Margary*. *H. P. Mallet*.—Indian Famines. *Col. H. Yule*.—Garden of Transmigrated Souls. Map of Sir D. Forsyth's Mission to Kashgar.

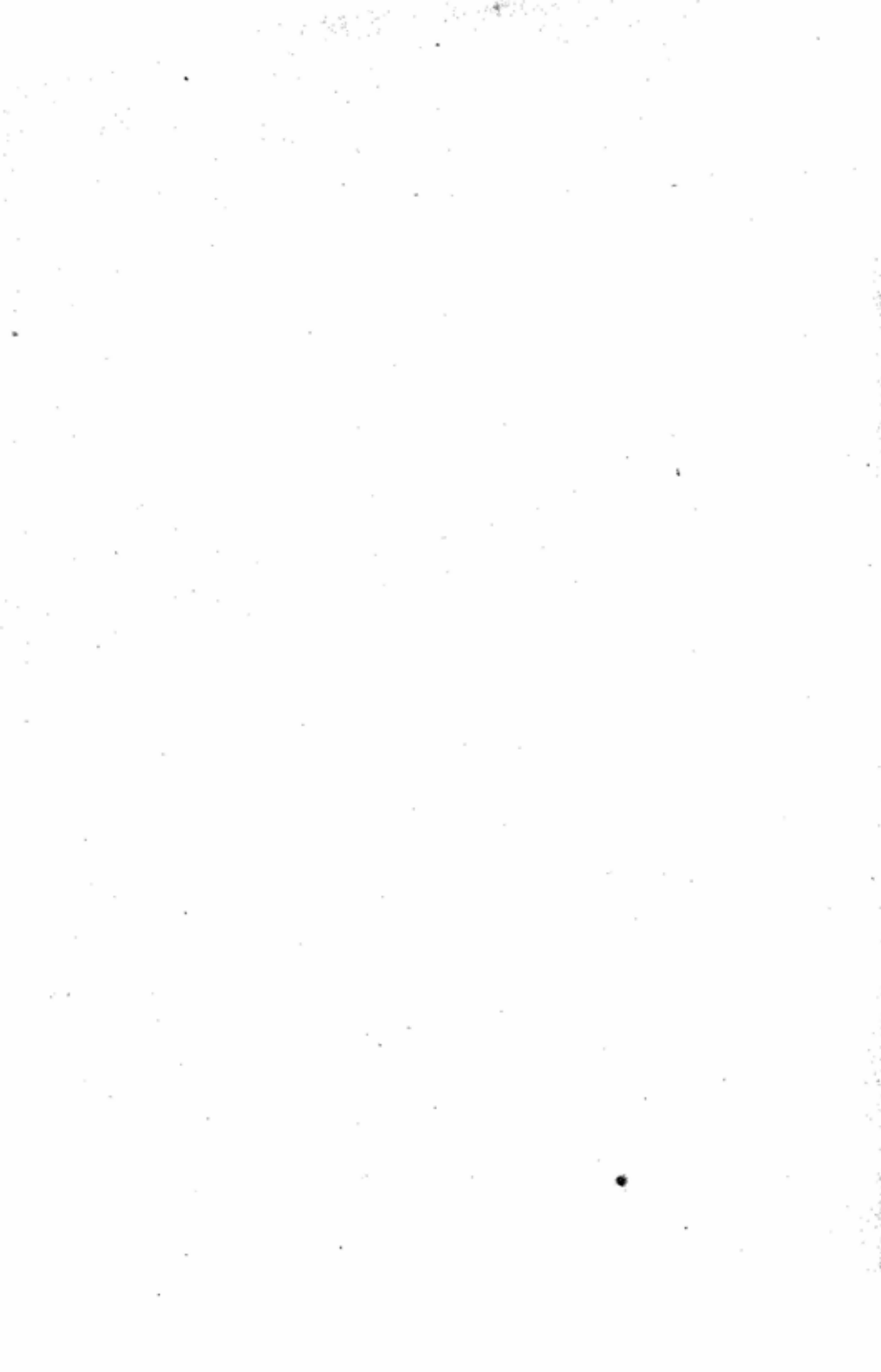
No. 6. *Prof. A. Vamberg*.—Kulja. Khivan Mission to India. Report of the Great Trigonometrical Survey of India.

The Indian Antiquary. Vol. IV. Pt. 43, 44, 1875.

No. 43. *M. J. Walhouse*.—Archæological Notes. *Rev. F. T. Cole*.—Santali Riddles. *W. T. Sinclair*.—Sculptures of the Cave at Lonâd Tâlukâ Bhiwandi. *Rev. Dr. R. Caldwell*.—Observations on the Kudumî. *J. G. Bühler*.—A Grant of King Guhasena of Valabhbî. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. *A. C. Burnell*.—Earliest Christian Missions in South India. *F. S. Growse*.—Translation of Copper-plate Grant at Udaypûr. *Major J. W. Watson*.—Translation of Copper-plate Grant at Udaypur.

No. 44. *Major J. W. Watson*.—Sketch of some of the Principal Places of Snake-worship in Kâthiâwâd with a brief account of Thán and the Dhândal Tribe of Kâthis. *Rev. J. Cain*.—Native Customs in the Godâvarî District. *J. Muir*.—Religious and Moral Sentiments freely translated from Sanskrit writers. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. *Rev. F. Kittel*. Seven Lîngâya Legends. On the Review of the Panchatantra. Tamil Proverbs.

Nature. Vol. 12, Nos. 288 to 292, 1875.





# PROCEEDINGS

## OF THE

# ASIATIC SOCIETY OF BENGAL,

### FOR AUGUST, 1875.

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The Monthly General Meeting of the Society was held on Wednesday the 4th August at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From the Editor, Prof. M. L. de Goeje, Leyden, a copy of a work entitled "Dīwān Poētæ Abu 'l-walīd Moslim ibnī-'l-walīd al-Anṣārī."

2. From Major G. E. Fryer, a copy of—"The Life or Legend of Gaudama," by the Rev. P. Bigandet.

3. From Dr. G. Bühler, a set of five photographs of Copper Sāsanas as follows:—

- |  |   |                |
|--|---|----------------|
| 1. Guhasena I, 2nd half  | } | of Válabhi.    |
| 2. Dharasena II, 2nd half                                      |   |                |
| 3. Yayabhata, 2nd half   | } | Gurjara Kings. |
| 4. Dadda II, 1st and 2nd halves                                |   |                |
| 5. Givindarāja, 2nd, 3rd, and 4th halves, Kāshtrakūta dynasty. |   |                |

4. From Mr. Eyre, Deputy Magistrate of Sāsserám, forwarded through Mr. W. L. Heeley, an impression on sealing wax of an Aśoka inscription found in a cave on the Chandan Pír Shalīd Hill near Sāsserám.

5. From Dr. O. Feistmantel, Geological Survey, a copy of "Die Bhagavad-gita" by Dr. F. Lorinser, Breslau.

6. From Major G. E. Fryer, a Kyeng Shield of buffalo hide.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

C. J. O'Donnell, Esq., C. S.

J. F. Hewitt, Esq., C. S.

Lt.-Col. Minchin.

The following are candidates for ballot at the next meeting—

S. S. Jones, Esq., B. A., C. S., Asst. Magistrate, Sásserám, proposed by Bábu Rájendralála Mitra, seconded by Mr. H. Blochmann.

R. R. Thomson, Esq., C. S., Asst. Commissioner, Karnál, Panjáb, proposed by Mr. D. C. J. Ibbetson, C. S. seconded by Mr. M. L. Dames.

The following gentleman has intimated his desire to withdraw from the Society.

E. Benedict, Esq., Calcutta.

The President announced that the Council had nominated, as fitting persons to become Honorary Members of the Society, Dr. Werner Siemens of Berlin, Dr. Böhtlingk of Bonn, and Prof. J. O. Westwood of Oxford.

The following were the grounds on which this recommendation was made :

Dr. W. Siemens, the elder of two brothers both famous and distinguished as practical physicists, has been from the first the most eminent and most useful of the pioneers of telegraphy. He first introduced the covering of telegraph wire with gutta percha and india rubber. He recommended the first submarine telegraph through the Red Sea, in order to establish direct communication with India from Europe. When this failed and telegraphing became so imperfect that letters often reached their destination before messages, he promoted with immense zeal and energy the Indo-European line by land, which has since worked and is working so well, that we have the London news of the evening before, in our morning papers. He has been more instrumental than any one else in making Telegraphic communication with Europe perfect, and is acknowledged to have been by far the greatest improver and perfecter of Telegraphy in general, thus becoming the general promoter of the most beneficial scientific improvement of modern times.

Dr. Böhtlingk is recommended in appreciation of the great services which he has rendered to the study of Sanskrit as evinced by his learned and elaborate Dictionary of the Sanskrit language.

Professor Westwood the celebrated entomologist, is recommended on account of the great service he has rendered to Indian (and generally to Asiatic) Zoology by numerous valuable entomological papers illustrated by his own hand ; among which may be particularly mentioned his splendidly illustrated "Cabinet of Oriental Entomology" and his "Thesaurus Entomologicus Oxoniensis," just completed.

In accordance with the rules of the Society these names would be hung up in the Meeting-Room of the Society until the next ordinary meeting when they would be balloted for.

The President also announced that Mr. W. T. Blanford had been appointed a Member of the Physical Science, Natural History and Library Committees.

Further, that the Council were desirous of recalling all Library books now out with Members, in order that they might be incorporated in the new Catalogue now under preparation, and would therefore request members to return any books they might have. They would only be wanted for a short time.

Mr. Blanford said he wished to ask the President one or two questions relative to one of the nominations for Honorary Members just laid before the meeting.

The President asked under what rule?

Mr. Blanford replied that his questions related to business before the meeting.

The President said, that there was no business before the meeting.

Mr. Blanford then proposed and Major H. H. Godwin-Austen seconded the following motion—

“That in accordance with the provisions of Rule 28, clause c, the order of business under Rule 29 be suspended in order to the transaction of business of an urgent nature, *viz.* the question of the nomination of an Honorary Member, just laid before the Society.”

The President explained that the election of Honorary Members was not before the meeting, but that the Council had nominated three under the rules of the Society, and that they would be balloted for in the usual way at the next meeting.

Dr. Ewart, seconded by Major Fryer, proposed an amendment to the effect that the question raised by Mr. Blanford was not of an urgent nature.

The President said that the meaning of the proviso quoted by Mr. Blanford was clear, it was to admit of such rare cases in which it was urgently necessary that the business should be completed on the same evening, and therefore to dispense with the necessity of notice of motion. Now it was obvious that the question raised was not of this kind and, more than this, it was a question with which neither individual members nor the meeting at large could interfere. The candidates for Honorary Membership had been nominated by the Council, and the members could not interfere with that nomination. They could reject the candidates, but nothing more. He, therefore, in virtue of the power vested in him as President, ruled that the business brought forward by Mr. Blanford was not of an urgent nature, and would not come under the rules. He would, in consequence, decline to put either the amendment or motion to the meeting as such suspension of the ordinary business would be in opposition to the

rules of the Society. It was quite competent for Mr. Blanford to give notice of motion at the ensuing ordinary meeting of the Society.

Mr. Schwendler, in the absence of Col. Hyde, exhibited some specimens of telegraph cable known as *Hooper's Core*. This core, most curiously, was penetrated in several places by a kind of grass. Capt. Green had found the core in this state. It had been lying first, for a long time in water, and afterwards had been stored in a dry room, when he discovered that grass had pierced the India rubber, almost looking as if it had been done on purpose. Mr. Schwendler remarked that although it was well known, that cable core, no matter if consisting of gutta percha or india rubber, was frequently attacked by marine animals, as for instance by the teredo, (a borer) and by the barnacle, a shellfish, it was quite novel to him, that vegetation might also act as an enemy to subterranean and submarine telegraphy. He need scarcely mention that in each place where grass had pierced the india rubber, the cable had become faulty, and in the points where the grass actually touched the copper wire, there was what is technically called dead earth, which destroyed entirely the working efficiency of the cable. He said the most probable explanation was that seeds had become attached to the core when under water, and had afterwards germinated when the core was stored. The store room had been dark and hot, the core wet, and thus all the conditions for a vigorous growth were fulfilled. The germs having come to life, not finding sufficient earth near them, pierced the core in search of nourishing substance which most likely was present in the india rubber.

The practical results of these facts were, that proper care should be taken when storing up insulated core in this country. *The core should either be entirely dry or entirely under water.*

Mr. Kurz had been asked to ascertain the kind of grass, but was unable to do so from the dried up specimens given to him.

Major Godwin-Austen exhibited a Celt, found in the Khasi Hills at Shillong, and made the following remarks thereon :

This celt, presented to the Society by Capt. W. Badgley, Assistant Supt. Topographical Survey, was found by him at Shillong, in the Khasi Hills, on the bridge near Col. McCulloch's house, lying on the surface. It was apparently of the hard slates that occur near Maoiang and had been ground into shape. It was very similar in form to one presented to the Society by Mr. H. B. Medlicott and which he obtained at Dibrugarh. These softer kinds of stone implements, he believed, were used as hoes, and some of the Kukis in the north Cachar Hills used a few years back stones set into a wooden handle in this way, for when the ground is soft during the rains they aid materially in tearing out the weeds. From the facility with which they can now get iron implements, stone will be scarcely or ever used. Col. McCulloch had told him they are very frequently found in Manipur.

Mr. Medicott remarked that the stone hatchet he had brought from Upper Assam two years ago was of the same shape as that exhibited by Major Godwin-Austen, but smaller and of a softer more earthy stone. It had been found two feet under ground in a plantation near Díbrugarh.

Letters were read—

1. From H. J. Rainey, Esq., forwarding the following note on the (probable) origin of the scientific appellation of the common striped squirrel (*Sciurus palmarum*, Linnæus).

"According to Jerdon,\* Indian naturalists appear to be sorely puzzled to account for the common or striped squirrel being designated *palmarum*, but I have just happened to discover, I think, the reason—such as it is—why it has been given that specific appellation by Linnæus.

Having occasion to refer to the "Travels of Van Linschoten," who journeyed in India towards the close of the sixteenth century, for some particulars regarding the early Portuguese in this country, I chanced to come across a passage, which appears to have somehow escaped my attention before now, and which, I venture to think, satisfactorily explains the origin of the specific name *palmarum*, universally applied by naturalists to our well-known striped squirrel. In describing the various animals abounding about "the towne and island of Goa" in quaint terms, he gives a curious, but sufficiently correct, description of what I cannot help taking to be our palm squirrel. After shortly noticing the "Monkies or Marmosets," which, he says, "doe great hurt to the Palme trees," he proceeds on, thus:—"In those trees you shall commonly see certaine little beasts called *Bichos de Palmeyras*, that is, *Beasts of the Palme trees*: They are much like Ferrets, wherewith men vse to hunt and catch Cunnies, and have a taile like the Penner of an Inke-horne, and grayish speckled haire: they are prettie beasts to keep and to pass the time withall."†

There can be no doubt, I believe, that this is no other than our veritable so-called palm squirrel, and it is most probable that Linnæus named it *palmarum* from its Portuguese designation aforesaid,—*Bichos de Palmeyras*, or 'Beasts of the Palm tree.'

It would be worth knowing if these squirrels are still numerous about Goa, and if they are there to be met with more frequently on the palm than any other kind of tree. Should they be found in Goa to evince no partiality for the palm as their abode, then the eminent Swedish naturalist, who may be said to be the founder of botanical science, was evidently misled by the inaccurate observation of the early Portuguese in India in this particular, and induced to give it, if not an absolute misnomer, at least an inappropriate designation which is most liable to give those unacquainted

\* *Mammals of India*, London, 1874, p. 171.

† *Early Travels in India*, First Series, Calcutta, 1864, p. 223.

with the animal in its wild state, an erroneous idea of its habits. It has therefore often occurred to me, and doubtless to many others besides, that it would be well if scientific nomenclators could be induced to change its specific appellation *palmarum* for *striata*,\* especially as none of the other several species of the striped squirrels, to wit, the jungle, the Travankor, and Nilgiri squirrels have that specific designation, being denominated, respectively, *S. tristriatus*, *S. Layardi*, et *S. sublineatus*.

2. From Dr. W. Munroe, Fife, Scotland, requesting information regarding the mention of Leprosy by ancient Hindu writers. Dr. Munroe asks—

1. Can the time at which mention is first made of Leprosy be indicated approximately?

2. Is it when first spoken of mentioned as a disease then common all over India, or is there any indication of its having been imported from the West?

3. Are any of the books from which the Susrutas is compiled as old as 1300 years B. C. and are the notices in regard to Leprosy contained in these very oldest parts of the work?

I am inclined to think from my inquiries on the subject, that leprosy was originally a disease of Central Africa which has spread and is still spreading wherever constant and continued human intercourse has been or is carried on.

My reference to the time 1300 years B. C. has of course reference to the Exodus of the Israelites.

P. S. I would be very grateful for any references to translations into English or French, likely to be available in this country of Hindu works, referring to leprosy.

These questions were referred to Bábu Rájendralála Mitra, who has been good enough to supply the following information on the subject—

"I regret I cannot answer the first question of the Doctor categorically. Taking Sus'ruta to be 400 B. C. (this date is Wilson's, I take him to be two centuries older) we must look for the date of Charaka whom he quotes, in the sixth century B. C. Sus'ruta professes to record the lectures of his tutor Dhanvantari, and very sparingly quotes his predecessors; but his chapter on Leprosy is founded on Charaka, as Dr. Munroe will easily perceive by comparing Hessler's translation in Latin (published at Leipzig) with the enclosed from Charaka, which I have got prepared from him. In Sus'ruta's time Charaka was an old authority of great weight, and an interval of two centuries between the two is by no means an extravagant guess. Now Charaka quotes Átreya who was a son of Atri, a sage of great renown, who

\* *Penstriata* would perhaps be better still, in contradistinction to *Tristriata*.

is named in the Vedas, and was the author of one of our text books on Law. The name of *Ātreya* occurs in *Pāṇini*, whose date Goldstücker takes to be the 9th century B. C. It is also met with in the *Rig Veda Saṁhitā*, which dates from the 14th century B. C. Charaka also quotes *Bāgbhaṭa*, who, likewise, has a chapter on Leprosy. *Bāgbhaṭa*, again, quotes *Agnivesa*, who was a great grammarian, and is named in the *Madhukāṇḍa* of the *S'atapatha Brāhmaṇa* of the White Yajur Veda, and *Jātukarṇa*, who is named in the *Yājñavalkya Kāṇḍa* of the same Veda. The works of the last two are lost, but on the authority of *Bāgbhaṭa* we may fairly accept them to have been professors of medicine, though it is impossible to say whether they wrote on Leprosy or not. *Manu* mentions leprosy, but the recension of *Manu* we now have is supposed to be not older than the 6th century B. C. In *Sus'ruta's* work the word *Kuṣṭha*, the Sanskrit name for leprosy, has been used in a generic sense, and includes several cutaneous diseases which are not leprosy, but from *Ātreya's* description quoted by Charaka, it is evident that the word primarily meant leprosy. It does not occur in the *Rig Veda Saṁhitā*, which dates from the 15th century B. C., and if we could accept this negative evidence to be of any weight, we could say that the disease was not known in the 15th century; but as there is no reason why the name of a disease should occur in a book of hymns, it is of no value; while the name of *Ātreya*, which occurs in that Veda and has been cited as that of an authority on the subject, would carry us much beyond the 13th century B. C. to which Dr. Munroe limits the enquiry.

"The second question I can answer positively by saying there is no indication whatever of leprosy having been imported from the West.

"The third question has been already answered by my remarks on the first.

"I am not aware of any English or French translation of any Indian work on leprosy except what occurs in *Wise's Hindu System of Medicine*. I regret I have not a MS. of *Bāgbhaṭa's* work at hand to translate from."

*Extract from the Charaka Saṁhitā on the Pathology of Leprosy.*

"*Ātreya* says—'When the seven elements of the body become vitiated through the irritation of the wind, the bile, and the phlegm, they affect the skin, the flesh, the spittle and the other humours of the body. These seven are the causes respectively of the seven varieties of *kuṣṭha*. The *kuṣṭhas* thus produced, cause much pain and suffering. None of these varieties results, however, from the vitiation of a single humour. *Kuṣṭhas* are of seven, of eleven, or of a larger number of kinds; and these, constantly irritating the system, become incurable.' We shall give a brief account of these as they are produced by the vitiation of the different humours. The wind, the bile, and the phlegm, being vitiated, react on the skin, &c. When the wind is most vitiated it produces the *kapāla kuṣṭha*, the bile the *audumbara*, the

phlegm the *maṇḍala*, the wind and the bile the *rishyajihvā*, the bile and the phlegm the *pauṇḍarika*; the phlegm and the wind the *sidhma*, and the three together the *kākanaka*.

"Excessive physical exercise after exposure to too much heat or too much cold; taking food after surfeit; eating of fish with milk; using barley and several other grains, such as *hayanaka*, *dalaka*, *karodudā*, &c., along with venison, milk, curdled milk, and buttermilk; excessive sexual intercourse; long protracted excessive fear or labour; fatigue, interruption of catarrh, &c., vitiate the phlegm, the bile and the wind, hence the skin and the three others become slackened. Thus irritated, the three elements corrupt the skin and others, and produce *kushṭha*.

"The premonitory symptoms of *kushṭha* are as follow: Want or excess of perspiration, roughness, discolouration, itching and insensibility of the skin, pain, horripilation, eruptions and excessive pain on the parts that are about to fall off.

"Some *kushṭha* eruptions are red, rough, spreading and small; they cause horripilation, slight itching, pain, and discharge of matter and sanies. These are caused by wind, and are called *kapāla-kushṭha* (scaley).

"Those that are of a coppery colour, which discharge matter, blood and sanies, cause itching pain, inflammation and burning, and produce worms, are also caused by wind. They appear like the ripe fig, and are hence called *auḍumbara*, (fig-like).

"Some are cold to the touch, raised, hard, reddish-white, clammy, itching and infested with worms. These too are caused by wind; they are called *maṇḍala* (circular).

"Those which are rough, red, white, yellow, blue or coppery, producing itching pain, worms, burning sensation, and insensibility, are also caused by wind. They have the appearance of the tongue of an antelope, and are hence called *Rishyajihvā*.

"Those which are white or red, spreading and elevated; which discharge blood, pus and sanies, and produce itching, are also caused by wind. They appear like the leaves of the white lotus, and hence are called *Paṇḍarika*.

"Those that are rough, red, thin, internally cold, sometimes reddish-white, which cause slight pain, itching, burning, and discharge of pus and sanies, are also caused by wind. They appear like the flowers of the pumpkin, and are called *sidhma*.

"*Kākanaka* and others have all the symptoms of *kushṭha*. They are incurable, while the others are curable. That which is incurable, can never be cured, and those which are curable sometimes become incurable.

"The wind causes coppery red roughness, pain, inflammation, shrinking, horripilation and insensibility of the skin. The bile produces burning, perspiration, pain, discharge of blood and suppuration. The phlegm causes whiteness, coldness, itching and confluent pimples.



"The worms, that form in leprous eruption, destroy the flesh, skin, veins, muscles and bones. When affected by them, the patient suffers from spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning, weakness, disrelish and indigestion. Then *kushṭha* becomes incurable. The man who neglects the disease at its commencement is sure to die. He who at the first breaking out of the disease tries to get rid of it may be sure of its being cured."

3. From Bābu Rājendralāla Mitra, regarding a mistake in his paper on the Skanda Gupta inscription from Anupshahar. The following is an extract from it:

"Owing to the fact of my having been in the mufassal, away from my books, when I wrote my paper on the Skanda Gupta inscription from Anupshahar, I had to depend a good deal on my memory, and it has, I am sorry to find, betrayed me in one instance. I have been made to say in a part of that paper (Journal XLIII, part I, p. 371) that Mr. Fergusson accepts the title *Mahārāja* to be synonymous with Emperor, when in reality it is the *Adhirāja* or *Mahārāja Adhirāja* to which he refers. (Journal Roy. As. Soc. IV, p. 84.) This, however, does not in the least affect the line of my argument, for I hold that when two sovereigns are not mentioned in the same document, the titles of a sovereign afford no indication of his real position. In the hyperbolical language of Indian panegyrists every sovereign is a second Indra, and there is no title, however lofty, which is not deemed fit for him. Still, as Mr. Fergusson has thought fit to make it a matter of serious complaint, and for the sake of accuracy, it is desirable that the correction should be prominently made, I request the favour of this letter being inserted in the Proceedings for August next."

5. From Bābu Rājendralāla Mitra, forwarding the following extract from a letter from Mr. E. Thomas.

"I have received your interesting paper on the transcription of the name, and the interpretation of the title, of Kunanda. In regard to the former point I am now inclined to go with you, and even beyond you.

"There can be no doubt that 𑀓 is *ku* in Indian Pali and 𑀓 is *bhu* in the same alphabet—equally, in Bactrian Pali, is 𑀓 *kr* and 𑀓 *bhr*. But the larger question now arises as to which of the two was the dominating and leading alphabet in the coins under notice. I am quite prepared to admit, both in virtue of the locality of issue and the ordinarily greater perfection of the Indian Pāli letters, that the alphabet in question must take precedence, this is further supported by the singular use of the Indo-Pali 𑀓 *jh* in the Bactrian legend of the B. M. coin to supply the place, we must conclude, of the hitherto undeveloped Bactrian *jh*, which appears as 𑀓 on the coins of Zoilus for the first time, and is conspicuously absent from the Kapurdi-giri and other inscriptions.

"If the age of Kunanda is rightly determined (which of course is still a very open query) we may justly infer that the Bactrian Pāli had not yet penetrated in force, as the official alphabet, as far as the banks of the Jumna.

"These points being conceded, I may readily accept your reading of *ku* for both versions; but I have a surprise for you, in the fact that a new coin of Col. Guthrie gives the name 𑀭𑀸𑀓𑀾 *Kunindasa*, as in the tribal name noticed in your P. S.

"In common consistency having surrendered the *r* in the name, I am bound to do the same with the title, though I would point out to you, that the Sanskrit "adages" about brothers hardly apply to this case, unless you can make the king a representative Indian *Aryan*. We have plenty of instances in proximate localities and not distantly removed periods, where the title of Brother appears in high honour. For instance, the ΑΔΕΛΦΟΥ ΤΟΥ ΒΑΣΙΛΕΥΣ (p. 205 Prinsep's Essays), *Māhārāja Bhrata* (p. 203), *Spahora Bhrata* (p. 204), and *Godophara Bhrata*, with ΑΔΕΛΦΙΔΕΥΣ (p. 216).

"You enquire what my opinion is about another paper of yours, in respect to the Saka dates. I have always stood up for the extended application of the Saka era in early documentary monuments, and especially in Gupta dynastic inscriptions, but I discriminate between the mere use of such dates in the Gupta *proper* documents, and the *post* Gupta references implied in "after the repose of Skanda Gupta," and the 585 years of the Guptas having elapsed (J. R. A. S., (old series) Vol. XIII, p. 5, note; 1850,) both of which points have been alluded to in my Indian Weights (note, p. 46). I do not see that the new translation of the Gupta passage from Albiruni at all alters the main inference, that the Vallabhis succeeded the Guptas, which fact is all that we need really care for.

"Mr. Burnell has been so obliging as to send me a copy of his "Southern Indian Palæography" in which he contests my, what he calls, lately propounded theory about the Laṭ alphabet (p. 6). But our Bengal friends have only to be told, that he quotes Prinsep solely from our Journal of 1837 (Vol. VI, pl. xiii), seems never to have seen Prinsep's collected Essays, and knows nothing of the later labours of Norris, Wilson, Dowson, Cunningham, &c., to understand how unsafe a guide he is likely to prove in demonstrating the rise and progress of the earlier Northern alphabets of India."

Bābu Rājendralāla Mitra said that it was very gratifying to him to note that the reading and translation of the Kunanda coin, which he had suggested, had met with the approval and support of so distinguished an antiquarian as Mr. Thomas. He concurred with Mr. Thomas in the opinion that the Indian Pāli was the leading and dominating alphabet, and that the Bactrian character was subsequently adapted to the vernacular of the time, very much in the same way, he thought, as the Arabic character

had subsequently been employed in writing the Indian dialects. This theory alone could explain the gradual introduction, and improvement in the forms, of certain letters which the Bactrian did not originally possess, but which formed a component part of the Indian Pali. The discovery of the name Kuninda in one of Col. Guthrie's coins was, he said, a remarkable one, and would open quite a new field of enquiry. He admitted that the adage about brothers was not quite convincing, and that there were several coins in which a brother's name had been invoked to shed lustre on the names of the authors of those coins. In such cases, however, the brothers were kings; but in the case of Kunanda, there was nothing to show that Amogha was a royal predecessor or contemporary, as the name appears without any regal title attached to it. It is well-known that Muhammadan sovereigns were proud to call themselves *ibn ul sultán*, but when one's father happened not to be a king no such allusion was made. The Bábu had taken the precaution to note this pointedly in his paper.

The Bábu also observed that he concurred with Mr. Thomas in making a distinction between the dates of the Gupta dynastic inscriptions and those of post-Gupta records; but he denied the reading of "repose of Skanda Gupta." The words *sánta* and *bhukta* on which reliance has usually been placed to produce that sense, correspond in every instance hitherto discovered with the word *varsha* 'year,' and simply mean 'on the expiry of the year so and so.' Where the Gupta era was intended the term *Gaupte* was employed, as in the Bádámi inscription published in the last October number of the *Indian Antiquary*. This era, the Bábu supposed, commenced with the expulsion of the Guptas from Guzerat, and not from their extinction.

The following papers were read—

- 1.—*Supposed Greek Sculpture at Mathurá.*—By F. S. GROWSE,  
M. A., B. C. S.

(Abstract.)

In 1836, Col. Stacy discovered at or near Mathurá a large and curiously sculptured block of red sandstone, which has given rise to much antiquarian discussion. It was carved on both sides with a Bacchanalian group, the principal figure in which was supposed to represent Silenus, and the whole to be the work of Bactrian Greek artists. The stone is now in the Calcutta Museum. During the cold weather of 1873-74, Mr. Growse discovered the companion block in the small village of Páli-Kherá, beyond the boundaries of the Mathurá township, close to the numerous mounds in most of which Buddhist antiquities have been discovered.

Mr. Growse then describes the figures and shows that the stones could not have been tazzas, as supposed by Col. Stacy, James Prinsep, and others. In his opinion the central figure is the wine-bibbing Balaráma, one of the tutelary divinities of Mathurá, attended by his wife Revati and the other

members of his family. The artist, therefore, was not a Greek, nor is there the slightest trace of Greek influence, an opinion also shared by Bábu Rájendralála Mitra.

The paper will be published, with illustrations, in Part I of the Journal.

Bábu Rájendralála Mitra said: "Having had occasion to comment at some length on Col. Stacy's Silenus now in the Society's Museum, I feel myself called upon to say a few words on the very interesting discovery of Mr. Growse. The execution and grouping of the figures are certainly uncommon, and the questions they suggest are: 1st, Is the subject Greek or Indian? 2nd, Is the workmanship Greek or Indian? and 3rd, What was the stone intended for? As regards the first question, I have already shown, in the 1st volume of my "Antiquities of Orissa," (pp 68 *et seq.*) that, as in the case of Sir Roger de Coverley's picture so in this, much may be said on either side. The maudlin character of the principal figure would indicate the subject to be as much Silenus, as Balaráma, the Bacchus of India; but the accessories are more in favour of the theory that would take it to be Balaráma, than of that which would give it a Greek character. Balaráma was noted for his constancy and had an only wife, and in both the groups of Col. Stacy and of Mr. Growse the principal figure is represented attended by an only wife. Balaráma had two sons, and both the groups represent two boys. I am not aware of any story of Silenus having had two sons. The tiger or lion in the obverse of the Silenus group is entirely of an Indian character. The scarf tied by a knot in front of the neck, upon which much stress has been laid by those who take the statue to be that of Silenus, is thoroughly Indian, and is invariably associated with Balaráma and his brother Krishṇa in the Hindu classics, and drunkenness was as much a weakness of Balaráma as of Silenus. The dress of the female figures in Col. Stacy's group appears to me to be formed of the *sári* and the *kurtá*, but in Mr. Growse's stone, as far as I can judge from the photographs before me, it appears more like the Ionic chiton with the *cholpos* over it; but it is extremely doubtful if the artist really intended to represent those garments, for the turban on the head of one of the female figures and the ornaments on the neck and ears of both are such as no Greek artist would ever think of. In the Stacy group the male figures are bearded, and this fact made me imagine that Silenus was probably intended, but there is nothing to prohibit a beard on the case of Balaráma, and on the whole I am disposed to accept Mr. Growse's theory of both the groups being representations of some Bacchanalian scenes in the life of Balaráma.

"The question regarding the Greek character of the sculptures is of much greater importance than the first, but it is one in which every European member here present is presumably better qualified to speak more authoritatively than I can pretend to be. I have studied the subject from copies,

casts, and pictures only, whereas Europeans are familiar with large collections of authentic specimens in their great national museums. I have, however, one advantage: I have studied the subject in my mature years, and am, I presume, free from those idols of infancy which grow with our growth as "the bone of our bone and the flesh of our flesh," and warp the result of even the clearest reasoning. Nor have I, in this respect, I fancy, any of those prepossessions which, according to Bacon, "infest the meditations, opinions, and doctrines of certain men with some conceit which they have most admired, or some sciences which they have most applied, and which give to all things else a tincture according to them utterly untrue and improper." Anyhow to judge of a thing we must have some data or proof, and in the case of sculpture the general character or style is what is commonly appealed to. Relying on it some men have not only been able to distinguish Greek from Indian sculptures, but to classify them into Greek, Greco-Bactrian, Greco-Indian, Greco-Scythian, and the like, and even to identify the portrait of Kanishka from the mere look of a statue fresh exhumed from the bowels of the earth. And yet I find general appearance to be a proof which is often of a very doubtful character and quite unreliable. It is an uncertain quantity, liable to be diversified under different circumstances and the knowledge and predilection of the observer, and what may be supposed by one to be decisively similar, may be pronounced by another as radically different in every line and feature. Doubtless, there is such a thing as style in painting and literary composition, which, however ethereal and undefinable, is nevertheless easily perceptible by experts, and the same may be said of sculpture; but in the latter case the difficulty of determining it is so very excessive that it cannot be accepted as a satisfactory proof in settling any question at issue with reference to any particular piece of sculpture. There may be, in a statue, a suavity of outline, or free treatment of the position or drapery, or general finish in chiselling,—peculiarities which are associated with Greek art—but they are of no import when closely inspected; and when the enquiry is what is the nationality of a statue found in a foreign soil, it is a flagrant begging of the question to say it must be Greek because it is good. I cannot better illustrate this than by reference to these two collographs which I submit to your examination. One of these is from the Ganes'a cave, Udayagiri, and the other from the Rānī Naur of the same place. Mr. Fergusson is of opinion that the story of "the Ganes'a is the purer and the more nearly allied to Greek art. That in the Rāja Rani, (by which he means Rānī Naur) though fully as vigorous and full of life, is inferior in style and much more Indian in detail and costume;" and he comes to the conclusion that "some of the Yavana invaders mentioned" in his work (p. 178 of the *Tree and Serpent Worship*, 2nd Ed.), "introduced Greek art into this remote corner some time, it may be, before or about the Christian era; but that instead of becoming more delicate and

refined, as it did at Amravarti, it became more vigorous and more local in its manifestations." (p. 269.) Not wishing to rely upon my own judgment in a case in which so great an authority had expressed a decided opinion, I communicated the above remark to Mr. H. H. Locke, of the Government School of Art, Calcutta, who has devoted his whole life to the study of art professionally, and is the most competent to decide the question without any native or patriotic leaning, and I got the following in reply from him; "I cannot at all support the quotation which you send me from Fergusson. I do not perceive any more of "Greek feeling" in the Ganes'a version of the fighting scene than in the Rānī Gumphā rendering. As to the Ganes'a carving being "first Greek attempt," and the Rānī "a degenerate local manifestation of it" there is absolutely nothing in the carvings themselves to support such a notion. The Ganes'a carving (so far as can be judged of in its present very mutilated state) is rather the ruder of the two." Without caring to decide who is right in the case you will, I have no doubt, readily admit that the evidence which can yield such diametrically opposite results, must be extremely faulty.

"The next test is relative proportion. It has generally been accepted as a very good test for determining the nationality of human figures; but seeing, that no two masters of the Hellenic art adopted the same relative proportions, and further, that they are subject to extensive variations according to age, sex, and other causes, not to advert to the fact that specimens of ancient Indian art are generally of so primitive a character that they are not amenable to technical rules, it is hopeless to deduce from them any reliable evidence for a general premiss. Doubtless there are certain peculiarities in proportion, which if properly studied by experts,—such, for instance, as the breadth of the head along the eyes, which in Greece almost uniformly measured five eyes, would doubtless be of value as collateral proofs, but they can under no circumstance be accepted as well-established majors for any universal conclusion.

"But while denying general appearance and relative proportions to be of much value as tests, I must admit that there are points in sculpture which must be accepted as conclusive. These refer to the representation of local peculiarities in art, and their value depends upon the amount of certainty with which their local character is established. Thus, for instance, the disposition of the hair of the head, which differed greatly at different times among different nations, and which, whenever the styles and their ages are well-known, must at once determine the nationality of the figures on which they are found.

"In the same way, in well-finished statues the high cheek bones and other peculiarities of feature, as also drapery, may be accepted as good tests to that end. Posture or pose being generally dependent on the nature of action intended to be indicated, and human nature being everywhere alike



and liable to produce the same or similar postures under similar circumstances, is not always a safe guide. The exigencies of art have also a great deal to do in the pose of a figure, without in any way indicating a necessary borrowing. This is best illustrated by two figures published in the 3rd Volume of General Cunningham's *Archæological Report*. In one of them we have the chariot of the Greek Apollo and in the other that of the Indian Sun. The workmanship of the two is as unlike as possible, but the figure of the chariot and the pose of the horses are alike. Now at first sight the latter may appear as a copy of the former, but bearing in mind that the chariot in Greece and India was of the same shape, we may ask could an artist, whether Greek or Indian, represent effectually horses in bas-relief in other than profile or three quarter view? A front view of a horse in bas-relief would show only the forepart, or must project considerably more than what any bas-relief would admit of; consequently the Greeks generally adopted the profile, or the three quarter view, in the former case ranging their horses, when more than one had to be shown, in a line so as to show the side of one, and parts of the heads and legs of the others, and in the latter case showing the front view of the chariot with half the number of horses running on one side and the other half on the other, an arrangement which militated against all laws of the resolution of forces. This unnatural position was necessary for the sake of art, and could not be avoided; and if we find a similar disposition under similar circumstances in India, we see no reason to assume that it must necessarily imply a borrowing or interchange of art. There are nevertheless peculiarities in pose which when well-known may be depended upon.

"But the most valuable tests are representations of local vegetation,—such as the acanthus capitals noticed by General Cunningham in the Eusofzai country,—local styles of ornament, local dress and the like. These can leave no room for doubt, and when they do exist and their local character is fully established, we may with perfect safety come to a positive conclusion. In making these remarks, it is the farthest from my wish to deny the possibility of detecting Greek art on sculptures found in India, or to withhold my assent to particular pieces of Indian sculpture being Greek or imitations of Greek work, but I cannot help thinking that the theory of Greek art in India has been a great deal too much over-worked of late, and conclusions drawn which are not admissible on the premises at our command.

"Applying these principles to the sculpture discovered by Mr. Growse, we find that its general appearance is not Greek, its relative proportions are not such as could be declared exclusively Greek, and its details are not of a Greek character. The paunchy figure of the so-called Silenus, is as unlike Greek of the post-Phidian age as can be; the females with their large busts, heavy earrings, and massive neck ornaments, are not the counterparts of the Venuses and Dianas of Greek art, and the pāyajama and chapkan of flowered

muslin in the Stacy group are garments which were unknown to Greek artists. Doubtless the art displayed in the two pieces of sculpture is superior to what we are accustomed to in other parts of India at a later age, but such of the ancient sculptures of Mathurá as have come to light along with these, and which are thoroughly Indian in subject, are not much inferior to them, and making due allowance for the decayed character of the Udayagiri, Sanchi and Amarávarti sculptures there is nothing to show that those who designed and carved them could not produce the Mathurá figures.

"With reference to the third question, I regret to have to differ from Mr. Growse in the opinion that the stones were intended for bases of pillars. When I first received his paper, I was led to think that he was right, and accordingly wrote to him to say that I would have to give up the opinion which I had before expressed of the stones being fountains or tazzas. But a thorough study of the subject induces me to revert to my old opinion. The top of the Stacy stone is carefully cut into a shallow circular cup and polished, so as to indicate that it was intended to be kept exposed and hold a fluid. Such a cavity could never be intended to serve as a receptacle for the end of a pillar. The Indian mortice is a square hole roughly cut and never polished, and this is the case with every stone that has been yet discovered in Muthurá, and the tenons are always in keeping with it. There is nothing to show that there ever was a departure from this rule in any case, and *à priori* it may be said that as a mechanical contrivance the shallow cup would never be equal in strength and security to a square mortice. I have not had an opportunity of seeing Mr. Growse's stone, but from the drawings and photographs sent by him the outline of its top appears like that of a shallow basin, which I imagine it to be. The stones are besides so shaped as not to be at all fit for stylobates. Their flatness, with carvings on two sides, would unfit them for such a purpose. As ornaments for a garden or courtyard, as fountains or tazzas, they would appear much more appropriate and befitting, and I am therefore disposed to take them for such."

2.—*Observations on some Indian and Burmese species of Trionyx, with a Rectification of their Synonymy and a Description of two New Species.*  
By W. THEOBALD.

(With Plates II, III, and IV.)

Since the publication of my observations on Indian Trionyches in the Proceedings for 1874, I have obtained additional materials for the study of the group, which, after due comparison with specimens in the Indian Museum, Calcutta, and with specimens previously in my own possession, suggest certain important modifications of the synonymy of our Gangetic species.



The species I propose to notice in this paper are *T. Gangeticus*, Cuv.; *T. sewaare*, Buch. Ham.; *T. ocellatus*, Buch. Ham.; *T. Phayrei*, Theob.; *T. stellatus*, Geoff.; *T. Peguensis*, Gray; *J. Grayii*, n. s., and *T. ephippium*, n. s.

The most important result of the proposed rectification of the synonymy of our Bengal species is the separation of a third species which by later writers seems to have been confounded under a closely allied one, so that the number of species satisfactorily known in Bengal is raised to three; and the discrimination of two new species of the genus from the Burmese countries, east of the Bay of Bengal.

*T. Gangeticus*, which may be regarded as the type of the genus, has from its great variability of colours, no less than from the imperfect material in museums, received a number of synonyms, of which the more important only are here given.

#### T. GANGETICUS, Cuv. (R. A.)

- |   |   |
|---|---|
| <i>T. stellatus</i> , var. <i>Japonicus</i> , Schl., F. Jap.                  | } Gray,<br>Cat. Tort.<br>Croc. and Amphibæonians. |
| <i>T. hurum</i> , Buch. Ham. and Illus. Ind. Zool.                            |   |
| <i>Gymnopus Duvaneellii</i> , D. et B.  |   |
| <i>Testudo chin</i> , Buch. Ham.  |   |
| <i>Test. ocellata</i> , Buch. Ham.  |   |
| <i>Aspidonectes Indicus</i> , Fitz., Gray., Sup. Cat. S. R. p. 97.            |   |
| <i>T. Javanicus</i> , Gray (not Cuvier), Illus. Ind. Zool.                    |   |
| <i>Tyrse Javanicus</i> , Gray, Cat. Tort. Croc. and Amph. p. 47.              |   |
| <i>T. gatajhol</i> , Buch. Ham. ( <i>gataghol</i> Gray).                      |   |
| <i>T. hurum</i> , Buch. Ham., Anderson, A. & M. N. H. Vol. IX, p. 382 (1872). |   |
| <i>Ganga kachim</i> of the Bengali fishermen.                                 |   |

From some reason or other, young individuals of this species would seem to be rare in Calcutta, as none exist in the Indian Museum (that is in a recognisable state), though adults are commonly brought to market, I believe, mostly from the direction and neighbourhood of Faridpur. Dr. Anderson asserts that the young are not ocellated, a statement which is met by Dr. Gray, by his figuring two young specimens of typical *Gangeticus*, each displaying four ocelli (P. Z. S., 1873, Pl. VIII). The smaller specimen, a little over one inch in length, displaying four symmetrical ocelli, whilst the larger one, measuring over three inches, displays the ocelli regularly shaped, the posterior pair being elongated and divergent, very much after the fashion of the spots in the figure of *hurum* in Buch. Hamilton's drawings, whilst both possess the radiating black lines on the head peculiar to the present species.

An equally serious error to that made by Anderson respecting this species, is made by Dr. Gray regarding the character of the genus, where

he ascribes to it only four sternal callosities, and where he makes six sternal callosities a generic character of *Landemania*. Now a fifth callous 'lunate' bone in the sternum is found not only in the present species when fully adult, but in *ocellatus* (= *hurum* of Anderson) and *Phayrei*, Theob. and is doubtless a generic character of *Trionyx* though not developed in early life, nor perhaps till extreme age. The sternum of *Landemania* figured by Gray (in the Sup. Cat. S. R. p. 96) is that of a *Trionyx*. The animal was not full grown, as may be inferred from the unankylosed suture of the abdominal plates, and the callosity of the lunate bone in front is at that age (as I have seen examples in *Gangeticus*) being developed from two osculant centres; though the figure would suggest the idea of the lunate bone being divided by a median suture, which of course it is not, and the idea is unfortunately supported by Gray speaking of these two osculant patches on the lunate bone as a 'sternal pair' in precisely the sense he refers to the abdominal or caudal pairs. This is a mistake, and as far as its sternal characters go *Landemania* is nothing more nor less than *Trionyx*.

Equally open to suspicion are the sternal characters of *Aspilus* (A. & M. N. H. 1872, Vol. X, p. 339, and Sup. Cat. S. R. p. 101), where the sternal callosities are described as "two lateral." Buch. Hamilton's figure of *T. gatajhol* would seem to be answerable for this character, but I cannot help thinking that the two lateral callosities seen in the above figure are *no callosities* at all, but scars or abrasions accidentally produced, the more so, as the figure is drawn from life, and in the living animal the bony callosities are not apparent but only become visible as the epidermis covering them dries and contracts over them. Dr. Gray, it is true, describes the linear callosities (without figuring them, which is curious) in a Javan specimen of *A. cariniferus*, but I see no ground for supposing that the *scars* (as I believe them to be) represented in the drawing of *gatajhol* represent callosities at all.

*T. Gangeticus* is somewhat variable in colour, ranging from dark to pale olive green. The head is symmetrically marked with black diverging lines or with thick black lines, more or less irregular in adults, or in very aged specimens perhaps wanting. The profile of the face is short. The mandible is armed inside with a median tubercle, hardly developed into a ridge, with a short ridge on either side springing from the inner edge of the jaw and invading for a short distance the masticatory area.

*Hab.*—The Ganges valley. Its occurrence east of the Bay of Bengal requires confirmation.

T. SEWAARE, Buch. Ham.

*T. sewaare*, Buch. Ham., Icon. ined. (*young*).

*T. sewaare*, Gray, A. & M. N. H. 1872, Vol. X, p. 336.

*T. chhim*, Buch. Ham. (*adult*) Icon. ined. (*Chim*).

*T. chin*, Gray, Syn. Rep. 47, t. 10.

*T. hurum*, in part of Anderson, Gray, and other authors.

*T. Gangeticus*, Gray, Sup. Cat. S. R. p. 97, "3 half grown specimens."

*T. ocellatus*, in part of Gray, Anderson, Theobald, and other authors.

*T. Gangeticus*, Theobald or part P. A. S. B. 1874, p. 77.

This species is based on a figure of Buchanan Hamilton, which Gray in his paper on the mud-tortoises of India (A. & M. N. H. Vol. X, 1872, p. 336) thus describes—"The upper surface of the head uniform olive with a distinct yellow spot on each side of the crown." From these yellow spots on the temples this species was regarded by Dr. Anderson as '*ocellatus*' (= *hurum*), and by myself from the characters of its skull as a young *Gangeticus*. According to Dr. Gray (Mud-tortoises, l. c.) this species has either four or six ocelli and he figures its skull in the P. Z. S. for January, page 50. This skull, as I remarked in my previous paper, exactly resembles a skull I extracted from a spirit specimen in my own possession, which fairly agreed, as I then thought, with the figure of *ocellatus*. There are among the spirit specimens in the Indian museum very few young specimens in the *ocellatus* livery, and no prepared skulls, but among the former I found some possessing the abrupt outline of head as in *Gangeticus*, and others with the more tapering skull of typical *ocellatus*. It is thus clear that the species with outline of head of *Gangeticus* is not a mere phase of growth of *ocellatus*, and, although there are no specimens of very young *Gangeticus* here for comparison, it is certain from Gray's figures (P. Z. S. 1873, Pl. VIII), that the colouration is identical with that of larger individuals and wholly unlike Buchanan Hamilton's '*sewaare*,' which name will therefore stand.

Of this species very little is known, save that it differs from its nearest allied species, *ocellatus*, externally, by wanting the broad yellow band across the snout (though displaying the temporal blotches), and internally by its skull and shorter face, which has the profile seen in *Gangeticus*. Its sternal characters are not known, nor is the adult, unless the figure of '*chhim*' should be intended for it.

Among Buchanan Hamilton's drawings is a very beautiful one of a large *Trionyx* named '*chhim*,' which shows *two temporal patches* and *no band across the nose*, and this drawing, I have little doubt, represents the adult, but no profile view of the head is given, and it is wrongly identified by Gray (who would seem to have misspelt the name '*chin*') as '*hurum*' in Syn. Rep. tab. X. I prefer, however, adopting the name of the immature stage '*sewaare*,' as '*chhim*' (or '*sim*' as corruptly pronounced) is the name applied in Eastern Bengal to the *chitra*, and would perpetuate error.

There is some confusion here. General Hardwicke calls the '*chitra*' '*sewteree*'—a name I believe still applied to it along the Ganges ('*chhim*' or '*sim*' being used in Eastern Bengal), whilst Buchanan Hamilton terms it

'*Testudo chitra*' and applies the term '*chhim*' to a *Trionyx*. Now it seems to me very probable that this is a clerical error, and the names have been transposed, as *chitra*, which I presume is an etymological cousin of '*chittee*,' '*chitul*,' '*chitur*,' meaning spotted (a spotted snake, the spotted axis, the leopard), is very applicable to the adult figure of '*chhim*,' as is at once seen by reference to the original drawing. In this drawing the back is represented as a dark plumbeous olive, very rich and uniform, and profusely studded with small equidistant and equal lenticular spots of a paler colour with their long axes arranged longitudinally. The head is uniform, with two large ragged temporal blotches of a pale colour, but no pale band in front of the eyes. Be this as it may, '*chhim*' is the recognised vernacular name of the *chitra* and is therefore inapplicable and must be set aside in favour of Buchanan Hamilton's other name '*sewaare*.'

*Hab.*—The Ganges valley.

From the separation now effected of this *Trionyx*, uniting the colouration of '*ocellatus*' and the facial profile of *Gangeticus*, it follows that the true *ocellatus* with a conspicuous yellow band across the snout, is still available as a name for the species designated *hurum* by Anderson and *Buchanani* by myself.

T. OCELLATUS, Buch. Ham. (*young*) Anderson and Gray. Pl. IV.

*T. Buchanani*, Theob., P. A. S. B. 1874, p. 78.

*T. hurum*, Anderson, A. & M. N. H. 1872, Vol. IX, p. 382.

*T. sewaare*, Buch. Ham. apud Anderson, l. c.

*Kala kachin* of the Bengali fishermen.

In his paper in the *Annals* l. c., Dr. Anderson does not discriminate, or even allude to the last described '*sewaare*,' though specimens in the museum were examined by him. They were not in the best state, but whether from this or from not discriminating them, he appears to refer them all to one species, *hurum* apud Anderson. From '*sewaare*' the present species is distinguished externally by a pale yellow band across the nose, in front of the eyes, which is absent in *sewaare*, and by a much greater development of the pale yellow blotch beneath the lower jaw on either side, which is slightly developed in '*sewaare*,' but forms a prominent band rising with a slight curve upwards towards the back of the neck in *ocellatus*. From *sewaare* it is also distinguished by the more elongate form of the anterior half of the skull, the profile of the face of *sewaare* being the same as in *Gangeticus*, and differing wholly from *ocellatus*, though the subspatulate symphysis of the mandible departs from the form of *Gangeticus* and resembles that of *ocellatus*.

For a comparison of the dermal characters there are no materials.

Dr. Anderson was clearly led to the identification of *ocellatus* and *hurum* by the fact that the figure of *hurum* displays four ocelli, which Dr. Anderson

argued were never seen in *Gangeticus*, but this view I consider Dr. Gray has entirely demolished, as I have already explained.

That the figure of *hurum* really represents one of the many varieties of *Gangeticus*, is rendered pretty certain, by the character of the black lines on the head, which in *ocellatus* or *sewaare* is uniform, or at most darker mottled, and not marked by thick lines, as in the figure of *hurum*, neither is there present the characteristic band across the snout, or the temporal blotches. The head of the specimen figured as *hurum* seems to have been a uniform and unusually pale yellowish colour or greenish yellow, but the style of marking by thick black lines decides it to belong to *Gangeticus*.

Skull and face of *ocellatus* more elongate than in *Gangeticus*. Mandible almost spatulate in front, with a well defined median groove or furrow (f. P. IV) inside. Young handsomely ocellated and the shell reticulately marbled with darker. A conspicuous yellow bar across the nose, and a large yellow spot on either temple, and a smaller one at the gape. General colour green, darker on the occiput, where it is mottled with paler. Throat and neck plumbeous white. Eyelids red (*vide* A. Anderson in litt.). Cartilaginous portion of carapace almost devoid of tubercles in half grown and adult specimens. Pittings of sternum coarser than in *Gangeticus*, and the abdominal plates more bent, I think, than in that species.

*Hab.*—The Ganges Valley. The specimen (figured one-third the natural size) was procured by Mr. A. Anderson, at Futtehghurh. The skull is figured of the natural size.

#### T. PHAYREI, Theobald. Pl. IV.

*T. Phayrei*, Theob., P. A. S. B. 1874, p. 75.

*T. cariniferus*, Gray (l. c.) Journ. Lin. Soc. Lond., Vol. X.

In my paper in the Proceedings (l. c.) I referred with doubt the present species to *T. cariniferus*, Gray, believing it to be identical with the figure in the Cat. S. R. p. 67, Pl. XXXII. As, however, the correctness of this surmise cannot well be verified and as *Phayrei* certainly differs from the specimens described under Gray's name, in the Sup. Cat. S. R. p. 101, and from the skull of *Aspilus cariniferus* figured on page 102, my name must stand for this species.

The colouration of the head of *Phayrei* is marked and peculiar. The head is pale coloured with elegant and symmetrical subreniform marblings of a darker colour, arranged regularly and occupying about an equal area with the ground colour whereon they are displayed. *T. cariniferus*, Gray, however, is described as being marked on the head and neck with white spots, in a fashion which the present species could display at no phase of its growth.

*Hab.*—Arakan, Pegu, and the Malayan Peninsula.

## T. JAVANICUS, Geoff.

*T. Javanicus*, Geoff. in Siebold's F. J., Chelonia, tab. V, f. 6 (skull).

*J. stellatus*, Geoff., Theobald, P. A. S. B. 1874, Pl. III.

The sternal character of the species found at Maulmein, which I consider identical with that from Java, may be seen by reference to my former paper (l. c.), but till a comparison is made with Javan specimens, the identity of the two forms cannot be considered as established. The *T. Javanicus* of Gray and Günther is, of course, *T. Gangeticus*, as pointed out by Anderson.

*Hab.*—Tenasserim, Java, &c.

## T. PEGUENSIS, Gray.

This species is as yet only known from the head of an adult in spirit, brought from Pegu by myself. Gray describes it as a "pale olive green minutely and closely punctulated with black. The upper lip, lower part of the sides of the head, sides of the neck, chin and throat uniform greyish white. The lower margin of the flap of the upper lip opaque white."

This species is no doubt not rare in Pegu, and it is very desirable to ascertain its sternal character and its colouration in a young state. A skeleton of probably this species exists in the Indian Museum, and another has been carried home by Dr. Anderson.

*Hab.*—Pegu.

## T. GRAYII, n. sp., Pl. III.

The specimen which I have the pleasure of naming in honour of the veteran zoologist so recently lost to us, was forwarded to me by Dr. Hungerford from the neighbourhood of Thayet-myo. The head was dried, but, on moistening it, the colouration of the skin was seen closely to resemble that of *T. Phayrei*, which I at first concluded it to be. The sternal characters, however, indicated a totally different animal, as may be seen by referring to the accompanying plate, wherein the shell is figured one third of the natural size and the skull of the full size. The skull on extraction proved to be very similar to that of *T. Peguensis*, Gray, but the style of colouration of the head was so different from that of *Peguensis* that it clearly belonged to some other species. The sternum of *Peguensis* is not known, unless a skeleton in the Indian Museum may belong to it, but as I have no means of ascertaining the colouration of the head of this specimen, I cannot say to which species, *T. Peguensis* or the present one, it belongs. The mandible is furnished with a median ridge (r fig. III) inside, wherein it differs from *ocellatus*, which has a median mandibular furrow instead, all of which marks in turn serve to diagnose it from its nearest allies, *Phayrei*, *Peguensis*, and *ocellatus*.

*Hab.*—The Irawadi valley.

J. EPIHIPPIUM, n. s., Pl. V, Figs. a, b, c (shell slightly reduced).

This species is based on a young specimen forwarded to me dried, from Tenasserim. The head on soaking displayed many yellow spots, something like '*stellatus*,' but the profile of the skull is very different from the figure in the *Fauna Japonica* of that species, a copy of which I give for comparison. On the back of the shell was a transverse dark mark (b. fig. V.) like a saddle-shaped flap, not quite symmetrical on both sides. Though a young animal, no traces of *ocelli* were visible, and the peculiar saddle marking has not been noticed that I can find on any described species. The mark is not visible on the dried shell but becomes distinct on soaking the shell in water, and was no doubt conspicuous during life. Anterior odd bone of the thorax *smooth*. Disk profusely covered with granular tubercles (each tubercle being rough like a mignonnette seed) ranged in sub-parallel rows. Thorax considerably arched with a prominent vertebral ridge. Sternum very cartilaginous without any pitted bone whatever. The species approaches '*ornatus*,' but would seem to be distinguished by its colouration from that species, and from all others with the descriptions of which I am acquainted. Those who may be inclined to question the specific value of colouration in the young of this genus should remember the words of Dr. Gray, who remarks that the "colouring of the young animal forms one of the best characters of the species of the genus" (Sup. Cat. S. R. p. 103).

*Hab.*—Tenasserim.

I have quite failed to arrive at any satisfactory opinion, as to whether any of the species noticed in this paper should be referred to Gray's genus *Aspilus*—beyond the fact, that if the genus *Aspilus* really possesses only two linear callosities as stated, then none certainly belong to it that I am acquainted with, but I am inclined to doubt this character, partly from reasons stated before with respect to *B. Hamilton's* figure of *T. gatajhol*, and partly from the youth of so many of Dr. Gray's specimens, and the consequent probability that this character may have been partly due, where observed in some cases, to immaturity.

There is, however, one character which may be made to serve as the means of dividing this genus into sections, each possessing a fixed geographical range, and that is the character of the mandible, for in all the species from the eastern coast of the Bay of Bengal, the mandible is traversed inside, in front, by a sharply marked median ridge (r. Plate III), whilst in species from Hindustan, in place of this ridge there is either a smooth surface or a depression (f. Plate IV).

The members of either section may be briefly characterised as follows.

Section A.

*Mandible smooth in front inside, or traversed by a median furrow or depression.*

1. Head ornamented with radiating black lines in the young, and ocelli on the back. In aged individuals some thick black lines or markings, generally present. Colour a more or less lively olive green. Mandible smooth inside. T. GANGETICUS, Cuv.

2. Head ornamented with two conspicuous yellow temple patches and one across the snout. No black lines on the head, but more or less reticulate mottling. Ocelli in the young. Colour darker and more dusky than in *Gangeticus*. Mandible in front subspatulate with a deep central groove. Profile of head elongate (P. A. S. B. 1875, Pl. IV).

T. OCELLATUS, Buch. Ham.

3. Young ocellated and with the yellow temporal patches, but no band across the snout. Profile intermediate between *Gangeticus* and *ocellatus*. Mandible with a central internal groove. Adult (the presumed *T. Chim* of Buch. Ham.) brown, profusely spotted with paler.

T. SEWAARE, Buch. Ham.

All these three species inhabit the Ganges valley and perhaps other parts of Hindustan, but are not authentically known from east of the Bay of Bengal.

Section B.

*Mandible in front, traversed inside by a median ridge.*

4. Head regularly marbled with dark reniform spots. Osseous granulations on sternum sparingly developed, and only fully on animals of a large size. Young ocellated. (P. A. S. B. 1874, Pl. IV).

T. PHAYREI, Theob.

5. Head dark irregularly spotted somewhat as in the last. Osseous granulations on sternum well developed in young individuals. (P. A. S. B. 1875, Pl. III).

T. GRAYII, Theob.

6. Head very elongate profusely yellow-spotted. Osseous granulations on sternum well developed. (P. A. S. B. 1874, Pl. III).

T. STELLATUS, Schl.

7. Head uniform dusky grey, minutely punctulated with black.

T. PEGUENSIS, Gray.

8. Head sparingly and irregularly yellow-spotted. A dark saddle-shaped band across the back. No ocelli. Young only known. (P. A. S. B. 1875, Pl. V).

T. EPHIPIUM, Theob.



It has yet to be determined whether any of the species included in section *A* range east of the Bay of Bengal or any in section *B* into Hindustan; also to which of the sections the other described Indo-Malayan species of *Trionyx* should be referred; and additional particulars of all are still much wanted.

What, moreover, *Aspilus cariniferus*, Gray, from Puna really is I do not know, and should be much obliged to any one who would forward me soft turtles from that locality to settle the question.

P. S.—A very curious account of the habits of some of our river turtles, probably of the present family, was communicated to me by Lt. Col. Swiney, 24th M. N. I. This officer was one day preparing to fish in the Narbada, when he remarked a funeral procession directing its way to the spot he had selected for his work. Putting up his rod, he watched the affair, and was surprised soon to see numerous little black bodies in the river, which proved to be turtles hastening to the scene of operations. The creatures even had the boldness to leave the water and had to be kept off the body with sticks. The body was that of a poor man, so after slightly burning the face, it was pitched into the river and then it was a sight to see the race that took place between the turtles on shore and those in the water to get at it. The place in question was the ordinary burning ghát of the neighbouring villages, and these turtles were evidently exercising their vested rights in these funeral baked meats, and were really in so doing performing useful service.

Mr. Wood-Mason remarked that Mr. Theobald was in all probability quite right in assuming that the very young in all the three Gangetic species of *Trionyx* were ocellated, the very young of a multitude of closely-allied forms being often so similar as to be nearly, if not quite, indistinguishable from one another. Such cases were explicable on what had been called the "recapitulation hypothesis," according to which the remarkable series of changes which every individual in passing from its simplest to its completely adult form underwent were so many more or less complete repetitions of the forms which its ancestry had successively exhibited in bygone ages: to adopt Hæckel's formula "the development of the individual (*ontogeny*) was a brief and rapid recapitulation of that of the species (*phylogeny*)."

We might therefore feel confident that these young turtles in their ocellated livery showed us the colouration of the progenitor of the group. In conclusion, he alluded briefly to the possibility of forming, by a study of the development and of certain peculiarities in the adults of their living descendants, some idea of the colouration of many animals long extinct: for instance, from the existence of longitudinal stripes in the young of the wild pigs of India and Europe and from the tendency in the young of feral individuals

of domesticated races to re-assume this striped character, from the brilliantly-striped foetus of the Asiatic and American tapirs, from the shoulder and leg-stripes of many horses and especially from the colouration of the Zebra,—it might with confidence be inferred that the numerous porcine, tapirine, and equine animals that had existed during the deposition of the older tertiary strata were conspicuously striped creatures.

3.—*Descriptions of new species of Marine Mollusca from the Indian Ocean.*—By G. and H. NEVILL.

(Abstract.)

The following species are described as new :—

*Ringicula abbreviata.*

Regularly striated throughout ; whorls  $3\frac{1}{2}$ , spire peculiarly short ; outer lip crenulated as in *R. Charon*, H., without any tubercle ; columella with a broadly reflected, rugose callosity, with two teeth, parietal tooth large.

Long. 3, diam.  $2\frac{1}{2}$  mil. Ceylon.

*Drillia lucida.*

Smooth and glistening ; white, irregularly marbled with pale brown ; apex somewhat mamillate and sinistral ; whorls  $8\frac{1}{2}$ , divided with a deep groove below the suture, longitudinally, distantly ribbed, last whorl only transversely striated at its base ; columella smooth, sinus deep. Closely allied to Hind's *Clavatula quisqualis*.

Long. 8, diam. 3 mil. Persia, Andamans, Púri.

*Mangelia fulvocincta.*

Attenuately fusiform ; whorls 9, longitudinally varicosely ribbed, minutely and regularly transversely striated ; white with a brown band below the suture ; the lower portions of the last whorl, the outer lip and aperture are brown, as is also the columella ; sinus obsolete, canal very short and truncate.

Long. 8, diam. 3 mil. Bombay, Ceylon, Púri.

*Mangelia Fairbanki.*

Very close to Reeve's *hexagonalis*, but with more open canal, six denticulations on the outer lip, sharp transverse distant striae throughout, only three on each whorl ; leaden brown colour, stained a darker shade on the outer lip and on the columella.

Long. 6, diam. 2 mil. Bombay.

*Clathurella exquisita.*

Closely allied to Pease's *C. canaliculata*; differs by the absence of the brown line beneath the transverse white band, by the suture not being coloured brown, by the contracted last whorl, by the more prominent canal, and finally by its smaller size.

Long.  $9\frac{1}{2}$ , diam. 4 mil. Mauritius.

*Clathurella Smithi.*

Minute, angularly fusiform, attenuated; apex round, slightly sinistral; white, tinged with brown on columella and outer lip; whorls 7, acutely angled, depressly excavated near the suture, decussately keeled; columella twisted, sinus deep.

Long.  $3\frac{1}{2}$ , diam.  $1\frac{1}{3}$  mil. Persia.

*Clathurella perplexa.*

Resembles *Mangelia Fairbanki* in many respects; whorls 8, longitudinally broadly and somewhat convexly ribbed, transversely striated; ash colour, columella and outer lip brown; columella slightly twisted.

Long. 6, diam.  $2\frac{1}{2}$  mil. Bombay, Ceylon.

*Clathurella singularis.*

Elongate and fusiform, apex pointed; white, with a few obsolete brown markings on the last whorl; whorls 9, transversely regularly striated, longitudinally faintly and obtusely ribbed; columella straight and smooth, sinus deep and rounded; under the lens very minutely, regularly longitudinally striated. Allied to *Cithara Delacouriana* of Crosse.

Long.  $8\frac{1}{2}$ , diam.  $3\frac{1}{2}$  mil. Andamans.

*Clathurella Masoni.*

Ovately fusiform, white, peculiarly scalariform; six angular whorls, broader above than at their base, longitudinally strongly ribbed, transversely prominently, distantly striated; columella smooth, sinus very deep, aperture small and contracted. Allied to *Pl. scalata* of Soubervie.

Long. 4, diam. 2 mil. Andamans.

*Clathurella Martensi.*

Conically fusiform, dark brown with lilac granules; seven rounded whorls, distantly reticulated, with three rows of large granules where the ridges bisect one another; an excavated furrow towards the base of the last whorl; columella strongly twisted, of a lilac colour with a few denticulations at its edge; the aperture and denticulations within the outer lip are also lilac-coloured; sinus deep, outer lip abruptly contracted near its base, forming a strongly marked canal.

Long. 5, diam. 2 mil. Ceylon.

*Clathurella enginaeformis.*

Convex, narrowly elongate, resembling certain species of *Engina*, peculiarly attenuated and contracted at base, spire pointed; white, with a single broad irregular yellow band; whorls seven, distantly reticulated, the interstices under the lens closely longitudinally striated, regular and rounded granules where the ridges bisect one another; sinus deep, but contracted; aperture very straight and narrow.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{4}$  mil. Ceylon.

*Clathurella contortula.*

Globosely conical, peculiarly bent, apex very obtuse, white; whorls six, longitudinally prominently ribbed, distantly transversely striated, imparting a granulose appearance to the ribs; columella peculiarly twisted, aperture narrowly contracted; allied to Reeve's *Pl. obtusa*.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{4}$  mil. Ceylon.

*Clathurella Blanfordi.*

Elongate, cylindrically ovate, apex sharp and pointed, deep violet-coloured throughout; whorls  $7\frac{1}{2}$ , longitudinally and transversely ribbed, ribs very prominent, of equal thickness, forming granules where they bisect one another; an excavated furrow near the base of the last whorl; sinus rather large, columella short and twisted, aperture moderately wide, contorted.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{8}$  mil. Annesley Bay, Red Sea.

*Clathurella Armstrongi.*

Pyramidically elongate, angular in the middle of the whorls, very pointed at base, apex sharp, uniform brown throughout; whorls 8, obtusely and distantly longitudinally ribbed, transversely striated; columella peculiarly twisted with a shining callosity which is rugosely granulated as in *Cythara*; aperture short and contorted, sinus remarkably deep. Allied to *Pl. arcata* of Reeve.

Long. 5, diam.  $2\frac{1}{4}$  mil. Andamans and Paumben Straits.

*Cythara gradata.*

Narrow, ovately oblong, apex very obtuse, pure white throughout; whorls six, reticulated; columella straight, slightly rugose; aperture contracted, sinus small, outer lip very thick, rounded.

Long.  $5\frac{1}{2}$ , diam. 2 mil. Ceylon, Bombay.

*Cythara dubiosa* (? *coniformis*, Gray).

Very closely allied to, if not the same as, Gray's *coniformis*; greater thickness, straighter outer lip, and less oblique longitudinal ribs seem to distinguish this form.

Long.  $7\frac{1}{2}$ , diam. 4 mil. Mauritius, Andamans.

*Cythara Isseli.*

Thick, ovately conical, apex pointed; white, orange banded in the middle of the whorls; whorls seven, reticulated; columella nearly straight, with a moderate callosity, closely rugose; aperture narrow, sinus moderate, outer lip thick, transversely striated.

A decollated specimen of 4 whorls only—Long.  $7\frac{3}{4}$ , diam. 4 mil. Ceylon.

Var. *Cernica*.

A perfect specimen—Long.  $6\frac{1}{2}$ , diam.  $2\frac{3}{4}$  mil. Mauritius.

*Nassa obesa.*

Thick, globosely conical, spire pointed; brown marbled indistinctly with white, stained near the suture dark brown, coloured exactly like Reeve's fig. of *N. mutabilis*, L.; whorls 10, longitudinally obliquely, thickly ribbed, ribs more or less obsolete on the back of the last whorl; transversely distantly grooved, some of the grooves more deeply incised than others, the upper ones form two rows of more or less granulose ridges beneath the suture. Allied to Reeve's *N. algida*.

Long. 22, diam. 14 mil. Kutch.

Var. *Ceylanica*.

Smaller, more acuminate, less globose, with the suture more distinct; sculpture more obsolete.

Long. 19, diam. 10 mil. Ceylon, Penang.

*Columbella (Mitrella) balteata.*

Small, elongate, fusiform; spire about the same length as the last whorl; light reddish-brown, apex red, a single belt of dark red in the middle of the whorls between the ribs, these latter are indistinctly white spotted in their centre; whorls 7, longitudinally ribbed, transversely striated, grooved below the suture; columella simple and twisted, outer lip acute, slightly emarginate above.

Long. 5, diam.  $1\frac{1}{4}$  mil. Mauritius.

*Zafra polita.*

Slenderly fusiform, smooth, attenuated at both ends; spire contorted, nearly as long as the last whorl; white, with two bands of irregular opaque white flakes on each whorls; whorls six, striated at base of last whorl only; outer lip remarkably thick and bent in, making the aperture peculiarly contracted.

Long.  $3\frac{1}{2}$ , diam.  $1\frac{1}{2}$  mil. Mauritius.

*Zafra semisculpta.*

Turreted, narrowly lanceolate, apex pointed; spire a little longer than the last whorl; horny-brown throughout, whorls seven, longitudinally

thickly ribbed, ribs obsolete on the back of the last whorl, which is transversely striated at its base; columella with a sharply defined callosity, outer lip scarcely thickened, not as long as the columella; aperture very narrow.

Long. 3, diam. 1 mil. Burma.

*Sistrum ventricosulum*.

The smallest species known of the genus, very gibbous, ovately ventricose, thick, abruptly attenuated at base; spire short, acute, about  $\frac{1}{2}$  the size of the last whorl; white, stained with brown; whorls seven, with two rows of prominent pointed granules, the lower row the larger; canal long, not recurved; four tubercles within the aperture, the two upper ones very prominent; outer lip remarkably thickened, slightly emarginate above.

Long.  $5\frac{1}{2}$ , diam.  $3\frac{1}{2}$  mil. Ceylon.

*Eulima acufornis*.

Very elongate, sharply pointed, flexuous; whorls 17, cylindrical, slightly angulate at their base, except the last whorl which is short and rounded; varices obliquely continuous. Allied to *E. lactea* and *flexuosa* of A. Adams.

Long. 10, diam.  $2\frac{3}{4}$  mil. Andamans.

*Rissoina (?) abnormis*.

Small, thick, shortly fusiform, white; apex remarkably truncately sinistral; whorls six, longitudinally ribbed, more or less obsolete towards the base of the last whorl, throughout transversely closely and rugosely striated; columella strongly twisted at base, covered with a moderate callosity; aperture small, peculiarly deeply channeled at base; outer lip produced and rounded, very thick, transversely striated, crenulated at the margin.

Long. 3, diam.  $1\frac{1}{2}$  mil. Mauritius.

*Cyclostrema eburnea*.

Depressly orbicular, thick; whorls five, sharply angled below their centre, longitudinally obliquely plicated, obsoletely granulated at the angulation, interstices very closely transversely striated; a remarkable very prominent, thick keel at the periphery, sculptured like the whorls;  $\frac{2}{3}$  of the base also sculptured as above, smooth on the remaining  $\frac{1}{3}$  round the umbilicus; umbilicus moderate, partially covered by the thickened columella. Allied to Maryatt's *C. cancellata*.

Alt.  $2\frac{1}{2}$ , diam.  $4\frac{3}{4}$  mil. Púri.

The following synonyms are also recorded:

*Columbella lactescens*, Souv. = *Columbella pardalina*, Lam. var.

*Murex Crosseana*, Lien. = *Latirus gibbus*, Pease.

*Murex Lienardi*, Crosse. = *Sistrum fiscellum*, Ch. var.

*Mitra Antoniae*, H. Ad. = *Mitra pretiosa*, Rv.

*Mitra amanda*, Rv. = *Mitra cruentata*, Ch. var.

*Ringicula minuta*, H. Ad. = *Ringicula acuta*, Phil. var.

*Euchelus Lamberti*, Souv. = *Tallorbis roseola*, Nev.

*Olanculus Tonnerrei*, Nev. = *Trochus Satrapius*, v. M.

*Minolia variabilis*, H. Ad. = *Gibbula Holdsworthana*, Nev. var.

The genus *BACULA*, H. and A. Ad = *ARCUELLA*, Nev.

Finally, *Marginella Isseli* is suggested for *M. pygmæa*, Issel, not of Sow-  
erby; and *Clathurella Peasei*, Nev. for *Cl. canaliculata* of Pease, not of Reeve.

The paper will be published in full in the forthcoming number of Jour-  
nal Part II, with illustrations.

4.—*The evidence of past Glacial Action in the Nágá Hills, Assam.*—By  
Major H. H. GODWIN-AUSTEN, F. R. G. S., F. L. S., &c.

(Abstract.)

In this paper the author points out that on so low a latitude as 25°  
30' N. glaciers of considerable size must have once filled the valleys of the  
Burrail Range. The moraines observed are to be seen under the highest  
part of the Burrail, where it attains an elevation of 9,890 ft. The thick  
deposits of boulders and clay in the upper sources of the Barák were also  
attributed to the greater size of the river during the same period.

Mr. W. T. Blanford remarked that at the time when glaciers existed  
in the Burrail, that range was probably much higher than now, but since  
reduced by the effects of denudation.

The paper will be published, with illustrations, in Part II of the Journal.

5.—*Photography in connection with the Observation of the Transit of*  
*Venus at Roorkee, December 9th, 1874.*—By Capt. J. WATERHOUSE,  
*Asst. Surveyor General of India.*

(Abstract.)

The author, after briefly stating the object of photographic obser-  
vation of the Transit, gives an account of the experiments undertaken to  
find a suitable dry process and states the formula for the coffee-albumen  
process with which the best results were obtained. The instruments used  
and the photographic arrangements of the observatory and dark-rooms are  
described. The reasons for discarding the dry process and adopting the  
wet are stated and an account given of the operations on the day of the  
Transit. In conclusion, suggestions are made with regard to the photographic  
observation of the Transit of 1882.

The paper was illustrated by a copy of one of the six-inch photographs taken and a Janssen plate. The Janssen slide was also exhibited and its construction explained.

The paper will be published in Part II. of the Journal.

- 6.—*List of Mammalia collected by the late Dr. Stoliczka, when attached to the Embassy under Sir D. Forsyth in Kashmir, Ladak, Kashgar, and Wakhan, with descriptions of new species.*—By W. T. BLANFORD, F. R. S., F. Z. S.

(Abstract.)

In this paper the author describes some new mammalia, principally rodents, from the collections made by the late Dr. Stoliczka when accompanying the mission under Sir D. Forsyth to Yarkand and Kashgar. He especially called attention to the large number of species of hares and pikas or tailless hares which had been obtained; no less than five of the former, of which four appeared to be new, and three of the latter, of which two were new, were represented in the collection. There was also a new marmot from the Kashkasu pass, between Yarkand and the Pamir.

The paper will be published in Part II. of the Journal.

- 7.—*On the species of Marmot inhabiting the Himalayas and Thibet.*—By W. T. BLANFORD, F. R. S., F. Z. S.

In this paper the author notices the different species of Himalayan and Tibetan marmots, of which he recognised five, including the new species, viz. *Arctomys himalayanus*, *A. hemachalanus*, *A. robustus*, *A. caudatus*, and *A. aureus* sp. nov. He believed that *A. himalayanus* was not the same as the European *A. bobac*, although naturalists had united them.

The paper will be published in Part. II. of the Journal.

At the close of the meeting Mr. Schwendler exhibited a four horned sheep presented to him by Sir William Merewether. The animal comes from the Province of Sibi, Afghanistan territory. Sir William Merewether states that he has seen several of these four-horned sheep, that they all came from the same locality, and were most likely a breed. Mr. Schwendler said that the large size and beautiful form of the animal, as well as the beautiful wool it produced, would seem to make it advisable to breed from. He had announced to the natives in his neighbourhood that they would be allowed to send their sheep for breeding purposes, but none of them had responded, although they were told that no expense would be incurred thereby. It appeared to him that the natives of India as a general rule did not take that interest in the improvement by selection of their



domestic breeds that they ought to do, and that had been taken for the last fifty years, with such decided and practical results in Europe,—that there was much room for the improvement of domestic animals in India nobody could doubt.

Dr. McLeod apprehended that objects were brought before this learned Society not for the mere sake of exciting curiosity, but as a contribution to scientific knowledge or illustration of scientific doctrine. He would, therefore, be glad to learn from Mr. Schwendler whether he had any explanation to offer regarding the peculiarity which this sheep presented. Every departure from the normal type of development must be either a reversion, a variation, or a monstrosity, and these were capable of being brought into relation with similar facts. Was this sheep a reversion to some ancestral type, such as the turtles and horses which Mr. Wood-Mason had spoken of, or was the duplication of the animal's horns an aberration of development similar to the duplication of thumbs—sometimes symmetrical, sometimes asymmetrical and occasionally hereditary—which we sometimes met with in the human subject? Tegumentary appendages were perhaps more liable to variation than any other structure, and authentic cases were on record of horns growing from the human skin—the skin of the scalp especially; he had seen specimens of this kind in museums and once removed a horn, three inches long, from the chest of a native of the district of Jessore. Excessive developments of hair on the human subject belonged to the same class of phenomena. Not long ago he had read in the newspapers of a hairy family in Burmah in which this peculiarity appeared to be hereditary, and had seen drawings of similar cases in Edinburgh. Could Mr. Schwendler give any facts to show whether the duplication of horns in this animal was a reversion, a variation, or a monstrosity?

Mr. Schwendler said that he could not answer Dr. McLeod's question. He had formed no theory, since he was not sufficiently acquainted with the history of the animal. His object had merely been to exhibit an interesting and beautiful animal not easily to be met with at Calcutta, and to draw attention to the desirability of breeding from it. His own belief was, that it represented a local breed produced by artificial selection, on account of these four-horned animals being so very handsome, and most likely also to possess other superior qualities. Mr. Schwendler said it was well-known that there existed a four-horned antelope in India, but did not think that any reasons had been assigned for this strange duplication of horns. There were undoubtedly reasons for everything nature had produced, but he himself could not attempt to answer such difficult questions. That the four-horned sheep was not an individual accident or monstrosity seemed to be however certain, since many more sheep of the same kind were to be found in the same locality.

Major Godwin-Austen said that when in Kishtwár and Budráwar he had noticed that four-horned rams were rather common and in the larger flocks one or two would be seen; he had purchased one with very symmetrical horns, which he had kept for a long time. However, in most of them the horns were very crooked and badly set on. The people evidently kept these accidental varieties, looking on them as curiosities, and asking a longer price for them. He had never come across this kind of "sport" in any other part of the Kashmir Himalaya: it seemed a local peculiarity fostered by the retention of these males.

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## LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

*Presentations.*

\*\*\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXIII, No. 161.

*W. Crookes*.—On Attraction and Repulsion resulting from Radiation, Pt. II.—*J. B. N. Hennessey*.—Some Particulars of the Transit of Venus across the Sun, 1874, Dec. 9, observed on the Himalaya Mountains, Mussoorie. *W. H. Cripps*.—On a Continuous Self-registering Thermometer. *D. Ferrier*.—Experiments on the Brain of Monkeys.

ROYAL SOCIETY, LONDON.

The Quarterly Journal of the Geological Society, Vol. XXXI, P. 2, No. 122.

GEOLOGICAL SOCIETY, LONDON.

Proceedings of the Royal Geographical Society, Vol. XIX, No. IV.

*Coryton*.—Trade Routes between British Burmah and Western China.

ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Proceedings of the Institution of Mechanical Engineers. January, 1875.

*H. Fajja*.—On the Manufacture and Testing of Portland Cement, and the Machinery used in its production.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

The Journal of the Anthropological Institute of Great Britain and Ireland, Vol. IV, No. II. April, 1875.

*H. Clarke*.—Report on the Congress of Orientalists. *M. J. Walhouse*.—Account of a Leaf-wearing Tribe in India. *P. Harrison*.—Note on Phœnician Characters from Sumatra. *Col. A. L. Foz*.—Early Modes of Navigation.

ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Transactions and Proceedings of the Royal Society of Victoria, Vol. XI.

*R. L. J. Ellery*.—Suggestions for the Construction and Erection of Lightning Conductors.

ROYAL SOCIETY OF VICTORIA.

Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, von Carl Jelinek und Ferd Osnaghi. Neue Folge, X Band. 1873. IMPERIAL CENTRAL METEOROLOGICAL AND MAGNETIC INSTITUTE, VIENNA.

Bulletin de la Société de Géographie, Mai, 1875.

*Bigrel.*—Note sur une carte générale de la Cochinchine Française.

GEOGRAPHICAL SOCIETY OF PARIS.

Journal Asiatique, Paris, 7<sup>me</sup> Série, Tom. V, No. 2. Fev., Mars, Avril, 1875.

ASIATIC SOCIETY, PARIS.

Bulletin de la Société Impériale des Naturalistes de Moscou, No. 3, 1874.

IMPERIAL SOCIETY OF NATURALISTS, MOSCOW.

The Third Annual Report of the Board of Managers of the Zoological Society of Philadelphia, for 1874-75.

ZOOLOGICAL SOCIETY OF PHILADELPHIA.

Proceedings of the Academy of Natural Sciences of Philadelphia, U. S. Parts I. II. III. 1874.

THE ACADEMY.

Proceedings of the Boston Society of Natural History, Vol. XV, Pts. III and IV, 1873, and Vol. XVI, Pts. I and II, 1873-74.

Vol. XVI, Pt. II. *F. W. Putnam.*—Notes on the Genus *Myxine*. Notes on *Bdellostoma*. *A. S. Packard, Jr.*—Transformation of the Common House Fly. *A. Murray.*—Notice of a Gigantic Squid.

Memoirs of the Boston Society of Natural History, Vol. II. Part II. No. IV, and Part III, Nos. I and II.

Part III. No. 1. *E. S. Morse.*—Embryology of *Terebratulina*.

BOSTON SOCIETY OF NATURAL HISTORY.

Annual Report of the Board of Regents of the Smithsonian Institution for 1872. Smithsonian Miscellaneous Collections, Vols. XI and XII, 1874.

Vol. XI. *Th. Gill.*—Arrangements of the Families of Mammals, with analytical tables. Arrangement of the Families of Fishes, or Classes *Pisces*, *Marsipobranchii*, and *Leptocardii*. *A. S. Packard.*—Directions for Collecting and Preserving Insects.

Vol. XII. *F. W. Clarke.*—The Constants of Nature. Pt. I. Specific Gravities; Boiling and Melting Points; and Chemical Formulæ. *Prof. J. Henry.*—Telegraphic Announcements of Astronomical Discoveries.

Smithsonian Contributions to Knowledge, Vol. XIX.

*Brevet Major-General, J. G. Barnard.*—Problems of Rotary Motion presented by the Gyroscope, the Precession of the Equinoxes and the Pendulum. *S. Newcome.*—An Investigation of the Orbit of Uranus, with General Tables of its Motion.

SMITHSONIAN INSTITUTION, WASHINGTON.

The Complete Works of Count Rumford, Vol. III.

THE AMERICAN ACADEMY OF ARTS AND SCIENCES.

Report of the Commissioner of Agriculture for the year 1872.

Microscopic investigations. Influenza in Horses. Fish Culture. Silk-cultivation. City Milk-supply. Progress of Industrial Education.

THE AMERICAN GOVERNMENT.

\* Bollettino della Società Adriatica di Scienze naturali in Trieste, Nos. 2, 3, 4, February, March, April, 1875.

ADRIATIC SOCIETY OF NATURAL SCIENCES, TRIESTE.

Anales del Museo Público de Buenos Aires. Pt. XII, 1870-1874.

Boletín de la Academia Nacional de Ciencias Exactas existente en la Universidad de Córdoba, Pts. I, II, III, 1874.

PUBLIC MUSEUM OF BUENOS AIRES.

Annual Report of the Trustees of the Museum of Comparative Zoology at Harvard College, in Cambridge, for 1873.

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY, CAMBRIDGE, U. S.

The Organization and Progress of the Anderson School of Natural History at Penikese Island, for 1873.

TRUSTEES OF THE ANDERSON SCHOOL, CAMBRIDGE, U. S.

Observations on the Genus *Unio*, Vol. XIII, with an Index to Vols. I to XIII, by Isaac Lea, LL. D.

AUTHOR.

Notes on the Avifauna of the Aleutian Islands. Notes on Pre-Historic Remains in the Aleutian Islands. Catalogue of Shells from Bering Strait, and the adjacent portions of the Arctic Ocean, with descriptions of three new species. On Further Examinations of the Amaknak Cave, Captains Bay, Unalashka. On New Parasitic *Crustacea*, from the N. W. Coast, of America. Notes on some Tertiary Fossils from the California Coast, with a List of the species obtained from a Well at San Diego, California, with Descriptions of two New Species. Preliminary Descriptions of New Species of *Mollusca* from the Coast of Alaska, with notes on some rare forms, by W. H. Dall. U. S. Coast Survey.

AUTHOR.

On the Andamans and Andamanese. Notes on the Respiration of some species of Indian Freshwater Fishes, by G. E. Dobson. B. A., M. B.

AUTHOR.

Results of Meteorological Observations for 1874, taken at G. V. Jugrow's Observatory, Daba Gardens, Vizagapatam, by A. V. Nursingrow.

AUTHOR.

The Life or Legend of Gaudama, the Budha of the Burmese, by the Rev. P. Bigandet.

MAJOR G. E. FRYER.

The Calcutta Journal of Medicine, Nos. 2 to 6, Feb. to June, 1871, edited by Mahendra Lal Sircár, M. D.

EDITOR.

Professional Papers on Indian Engineering. Second Series. Vol. IV, No. 17, July 1875, edited by Major A. M. Lang, R. E.

A. O. Green. Borate of Lime Glaze for Tiles. Mountain Railway from the Nilgiri Hills. Memorandum on the removal of Obstructions in the Mahanuddy and Bhagiruthee.

EDITOR.

The Christian Spectator, Vol. V, No. 49, July 1875.

EDITOR.

Catalogue of Sanskrit MSS. existing in Oudh, discovered from 1st October, to 31st December, 1874, and Catalogue of Sanskrit MSS. existing in Oudh, Fasciculus VI. prepared by J. C. Nesfield, M. A. edited by Rajendralála Mitra.

DIRECTOR OF PUBLIC INSTRUCTION, OUDH.

Die Bhagavad-Gíta, by Dr. F. Lorinser.

DR. O. FEISTMANTEL.

Rámáyana, Pt. V, No. 2. Edited by Hemchandra Bhattacharjee.

EDITOR.

Report on the Excise Revenue in the Central Provinces for the year 1874-75.

Report on the Nágpur School of Medicine, Central Provinces for the year 1874.

Report on the Working of the Government Charitable Dispensaries in the Central Provinces for the year 1874.

Report on the Lunatic Asylums in the Central Provinces for the year 1874.

CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

### *Purchase.*

The Annals and Magazine of Natural History, Vol. 15, No. 90, June 1875.

T. Higgin.—On two Hexactinellid Sponges from the Philippine Islands, in the Liverpool Free Museum. F. P. Pascos.—Descriptions of some new Asiatic Species of Rhynchites. Arthur Viscount Walden.—Descriptions of some undescribed Species of Birds discovered by Lieut. W. Ramsay in Burma. E. A. Smith.—A list of the Gastropoda collected in Japanese Seas by Commander H. C. St. John, R. N.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, Vol. 49, No. 327. June, 1875.

No. 327. *F. Kohlrausch and O. Grotrian*.—On the Electric Conducting-power of the Chlorides of the Alkalies, Alkaline Earths, and Nitric Acid in Aqueous Solutions. *A. M. Mayer*.—Researches in Acoustics. *G. C. Foster and O. J. Lodge*.—On the flow of Electricity in a uniform plane conducting Surface.

Journal of the Society of Arts, Vol. XXIII, Nos. 1173 to 1176.

No. 1173. *J. Hogg*.—River Pollution with Special Reference to the Impure water supply of Towns.

No. 1174. *C. R. Markham*.—The Agricultural Statistics of India.

No. 1175. *A. Nobel*.—On Modern Blasting Agents.

No. 1176. Growth and Uses of Indian Sandal-Wood; Agricultural Statistics of India.

Reeve's Conchologia Iconica, Pts. 320, 321, containing *Solemya*, *Mya*, *Clausilia*, *Cylindrella*.

Sowerby's Thesaurus Conchyliorum, Pts. XXXI and XXXII, containing a Monograph of the genus *Mitra*.

The Indian Medical Gazette, Vol. X, No. 8, August, 1875.

The Academy, Nos. 162 to 166. June, July, 1875.

Poggendorf's Annalen der Physik und Chemie, Vol. 155, 1875. Nos. 5 and 6.

No. 6. *C. Neumann*.—Ueber die gegen das Weber'sche Gesetz erhobenen Einwände.—*R. Bunsen*.—Spectral-analytische Untersuchungen. *W. Siemens*.—Beiträge zur Theorie der Legung und Untersuchung submariner Telegraphenleitungen. *C. Fromme*.—Untersuchungen über den Magnetismus von Stahlstäben.

Gottingische Gelehrte Anzeigen, Nos. 17 and 18, mit Nachrichten, No. 11, 1875.

No. 17. *H. L. Fleischer's* Grammatik der lebenden Persischen Sprache. Nach *Mirza Mohammed Ibrahim's* Grammar of the Persian Language.

Revue Archéologique, No. 5, Mai, 1875.

Revue Critique, Nos. 19 to 22, Mai, 1875.

No. 19. *Recherches Orientales*, p. p. *Derenbourg*, *Ethé*, *Loth*, *Müller*, *Philippi*, *Stade*, et *Thorbecke*.

No. 20. *De Goeje*, *Le Divan de Moslim*.

Journal des Savants, April, 1875.

Comptes Rendus, Vol. LXXX, Nos. 17 to 20, May, 1875.

No. 17. *M. G. Planté*.—Recherches sur les phénomènes produits dans les liquides par des courants électriques de haute tension.—*M. Z. Pupier*. Action des alcalins sur la composition du sang. Recherches expérimentales sur la prétendue anémie alcaline. *M. Rabuteau*.—De l'action du fer sur la nutrition. *M. Heckel*.—De l'action de quelques composés sur la germination des graines (bromure de camphre, borate, silicate et arséniate de soude.)

No. 18. *M. Faye*.—Lettre sur la distribution de la température à la surface du Soleil et les récentes mesures de M. Langley. *M. Peslin*.—Théorie des tempêtes. Réponse à M. Faye.

No. 19. *M. Müntz*.—L'action du chloroforme sur les ferments chimiques et physiologiques. *M. de Tastes*.—Note sur la théorie des cyclones.

No. 20. *M. Faye*.—Quelques remarques sur la discussion au sujet des cyclones. *L. P. Secchi*.—Etude des taches et des protubérances solaires de 1871 à 1875. *M. L. de Wecker*.—Sur un nouveau procédé opératoire de la cataracte (extraction à lambeau périphérique).

Mélanges D' Archéologie Égyptienne et Assyrienne. Vol. II, Fas. 2.

Fas. 2. *F. de Saulcy*.—Lettres à M. Chabas sur quelques points de la géographie antique de la Palestine.

Revue des Deux Mondes, Vol. 9, Nos. 2 and 3, May and June, 1875.

May. *M. R. Radau*.—Le rôle des vents dans les climats chauds.

June. *M. I. Clavé*.—Etude de météorologie forestière.

The Jataka, together with its Commentary, being Tales of the Anterior Births of Gotama Buddha, by V. Fausböll, translated by R. C. Childers. Text Vol. I, Part I.

Travels and Adventures in the Province of Assam, by Major J. Butler.

Histoire des Mogols et des Tatares, par Aboul-Ghâzi Béhâdour Khan, edited and translated by Baron Desmaisons. Vols. 1 and 2. Text and Translation.

Dr. Webster's Complete Dictionary of the English Language.

### Exchange.

The Indian Antiquary. Pt. 45, Vol. IV, August, 1875.

The Dvairâsharâya (continued). *Rdmehandra G. Anag*.—The Gîrnâr Mâhâtmya. *Prof. Weber*.—On the Yavanas, Mahâbhâshya, Râmâyana and Kîshkajânâmâshâtami. Coins.

The Athenæum, pt. 568, April, 1875.

The Geographical Magazine, Vol. VII, No. VII. July, 1875.

Map of Western Mongolia, illustrating the Explorations of Miroshnichenko and other Russian Travellers. Capt. Napier's Travels in Northern Persia. Recent Russian Explorations in Western Mongolia.

Nature, Nos. 293 to 296, Vol. 12, June and July, 1875.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR NOVEMBER, 1875.

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The monthly General Meeting of the Society was held on Wednesday the 3rd November, at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From Bábu Mohini Mohan Roy, Pleader, High Court, two silver coins.

Mr. Blochmann said—

The two silver coins presented to the Society by Bábu Mohini Mohan Roy, were struck by Nusrat Sháh, king of Bengal. The two coins have no year nor mint-town, the margin having been cut away, the reverses being defaced by shroff marks; but they are of a new variety.

The coins were found in the Sundarban, in lot No. 46, Ahad Darya, about 21 miles east of Calcutta, and were in a cockle shell about a foot and a half below the ground.

2. From Capt. W. J. Williamson, Deputy Commissioner, Garo Hills, two silver coins.

Mr. Blochmann said—

Of the two silver coins presented to the Society by Capt. Williamson, one is a rupee struck by Dáúd Sháh, the last independent king of Bengal. The other is a unique silver coin struck by Nara Náráyana, the second Mahárájá of Koch Bihár, in Sáka 1477, or A. D. 1555. A figure of the coin has been given in Journal, Pt. I, No. III, for 1875, p. 306.

3. From S. Kurz, Esq., a coin called Lapeck (6000 = 1 dollar) from Cochin China.

4. From the Author, Capt. H. Trotter, R. E., a copy of an "Account of the Survey Operations in Eastern Turkistan, 1873-74."

5. From the Govt. of the N. W. Provinces, photographs of the Ancient Temples at Barwa Ságar, Barauli, in the Jhánsi district, and of Muhammadan buildings at Badáon and Kol.

6. From the Batavian Society of Arts and Sciences, a copy of a work entitled *Bôrô-Boudour*, by Dr. C. Leemans, together with photographs, and lithographs illustrating the work.

The President proposed and it was carried unanimously that the special thanks of the meeting should be given to the Batavian Society for this very magnificent and valuable donation.

7. From the Author, Dr. J. Fayrer, a copy of "*The Royal Tiger of Bengal, his life and death.*"

8. From the Author, Rev. K. M. Banerjea, a copy of "*Rig-Veda Sanhita.*"

9. From the Author, M. le Comte de Croizier, a copy of a work entitled "*L'Art Khmer.*"

10. From the Author, Mr. J. Beames, a copy of "*A Comparative Grammar of the Modern Aryan Languages of India,*" Vol. II.

11. From Mr. W. T. Blanford, a copy of a work entitled—"The Countess of Chinchon and the Chinchona genus," by C. Markham.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

S. S. Jones, Esq., C. S.

R. G. Thomson, Esq., C. S.

Dr. Böhlingk of Jena, and Prof. J. O. Westwood of Oxford, proposed by the Council at the last Meeting as Honorary Members, were duly elected.

The following gentleman is a candidate for ballot at the next meeting—

J. B. Knight, Esq., Calcutta, proposed by Dr. Oldham, seconded by Dr. Waller.

The following gentlemen have intimated their desire to withdraw from the Society—

Dr. V. F. Bellew.

Capt. J. C. Ross, R. E.

G. T. Peppé, Esq.

Bábu Gobindo Kumar Chaudri.

R. Knight, Esq.

The President announced that the Council recommend the appointment of the Rev. J. D. Bate, Allahabad, and Maulavi Abdul Hai, Calcutta, as Associate Members of the Society, in recognition of the services they have rendered to Oriental literature, the former by the publication of his *Hindí Dictionary*, the latter by his editions of several works in the *Bibliotheca Indica*.

The President also announced that the Council had appointed Mr. C. H. Wood a member of the Physical Science and Library Committees.

Mr. Wood-Mason exhibited specimens of a gigantic spider belonging to the genus *Mygale*, which had the power of emitting a loud stridulating sound, and stated that that interesting discovery had been made by Mr. S. E. Peal of Sibságar, who, at his request, had drawn up a most graphic account of his observations on the living animal. Mr. Mason had himself undertaken to ascertain the position, and to describe the structure of, the sound-producing apparatus, which he had found to consist of a *comb*, composed of a number of highly elastic and indurated chitinous rods, situated on the inner face of the so-called *maxillæ*, and of a *scraper* formed by an irregular row of sharp spines on the outer surface of the *chelicere*. This apparatus was equally well-developed in both sexes, as in most coleopterous insects, and was not confined to the males as in the *Orthoptera*, *Homoptera*, and the stridulating spiders (*Theridion*) observed by Westring, in all of which the exclusive purpose of the sounds emitted seemed to be to charm or call the opposite sex.

In conclusion, Mr. Mason discussed the probable purposes of the sound emitted, and pointed out how the *Mygale stridulans*, as he proposed to call the species observed by Mr. Peal, differed from its nearest ally *M. Javanensis*, in which no stridulating organs were developed. A full account would shortly be published in the Society's Journal.

Mr. W. T. Blanford exhibited several skins of Mammalia collected by Mr. L. Mandelli, of Darjiling, and stated that he had asked for the loan of some specimens of Tibetan mammalia to compare with those collected by Dr. Stoliczka in Ladák, and that Mr. Mandelli, with the greatest liberality, had sent the whole of his collection for examination, and presented the duplicates to the Indian Museum. That gentleman had also presented to the Museum a very fine pair of skins of the Tibetan Stag, *Cervus affinis*. Although a skin of this stag was once procured by Dr. Campbell, nothing so fine as the specimens now exhibited, it was believed, had been previously obtained.

The other skins brought to the notice of the meeting were merely a very small selection of the whole series sent, which comprised representatives of more than 50 species. Those exhibited consisted of the following species:—*Crossopus Himalaicus*, *Nectogale elegans*, *Felis Moormensis*, *Prionodon pardicolor*, *Urva cancrivora*, *Ailurus fulgens*, a fine series of squirrels including *Pteromys magnificus*, *Sciuropterus caniceps*, *S. alboniger*, *S. villosus*, and a species not hitherto identified, *Sciurus macruiroides*, *S. lokriah*, *S. lokrioides*, and *S. Maccollelandi*, also *Lepus pallipes* and *Lagomys Curzonæ*.

A black squirrel which was amongst the collections, although so finely coloured that it had all the appearance of being a distinct species, was probably a melanoid individual of *S. lokriah* or *S. lokrioides*, whilst a dark brown cat's skin had probably belonged to a very dark form of *Felis Moormensis*. This skin was brown, with a distinct black stripe down the back, and with the lower part of the tail whitish, as in *F. Moormensis*. The normal skins of *F. Moormensis* agreed well with the plate of *F. aurata* in the Proceedings of the Zoological Society for 1873, but differed much from a specimen from the Malayan peninsula in the Indian Museum.

The hare sent was probably the true *L. pallipes*, as it agreed well with the description, and it shewed that the species collected at Changchenmo in Ladák by Dr. Stoliczka, which Mr. Blanford had on a previous occasion referred with doubt to *L. pallipes* (J. A. S. B. 1875, p. 109), was distinct.

The most interesting mammals exhibited, however, were two water-shrews. One of these, *Crossopus Himalaicus*, had been long known as an inhabitant of the Himalayas and had lately been referred by Dr. Anderson to the genus *Crocidura*, on account of its dentition. Dr. Anderson, however, had overlooked the circumstance that the genus *Crossopus* was founded on external characters, and the present species must either be classed with *C. fodiens*, or made the type of a new genus. Prof. Milne-Edwards had lately re-classified the shrews and had proposed a separate subfamily for the aquatic forms, which subfamily included *Crossopus*, and some Asiatic and American types. One of these types, *Nectogale elegans*, a new genus and species, was described at the same time by Prof. Milne-Edwards from the collections brought by the Abbé David from Moupin in Eastern Tibet. One of the skins obtained by Mr. Mandelli evidently belonged to this species. Mr. Blanford said that he once saw a small mammal, which he was unable to secure, in a stream at a considerable elevation (about 15000 feet) in Sikkim, and he thought it probable that this was the *Nectogale elegans*. The species had broad palmated feet, with a row of bristles round the margin, and furnished beneath with sucker-like disks; the tail was strong with rows of stiff hairs down the lower surface and along each side, it was flattened towards the end and near the extremity had a row of white hairs along its upper surface. The colour of the animal was dull black with whitish glistening longer hairs scattered amongst the fur. A few similar hairs were to be seen on the lower back of *Crossopus Himalaicus* but they were fewer and less conspicuous.

This animal, if, as appeared in every way probable, it had been obtained in Sikkim, was a most interesting addition to the fauna of the country.

Capt. Waterhouse exhibited photographs on glass of the solar spectrum showing the extreme red rays, and read the following note regarding them.

While recently making some investigations on Dr. Vogel's interesting and valuable discovery of the effect of certain dyes in increasing the sensibility to the less refrangible rays of the spectrum, of dry collodion plates prepared with pure bromide of silver, I observed on several of the plates a reversed action in the part of the plate acted on by the red rays, so that the Fraunhofer lines in that region, which should appear light on a dark ground, came out dark on a light ground, and on some few occasions distinct traces of lines in the extreme red below A were also visible. This effect was most marked on the plates stained with a blue dye, one of the aniline or an analogous series, obtained in the bazar, but was also perceptible on plates stained with orange, red and green dyes. These plates were all slightly fogged, but as the reversed lines were not observed on plates prepared with uncoloured bromide, I attributed the cause to the action of the dyes alone.

On repeating the experiments on this action of the blue dye with another series of plates, prepared after the nitrate of silver bath had been purified so as to give plates entirely free from fog, I was rather surprised to find that the reversed action was no longer obtained. On thinking over the subject it came to my recollection that in the early days of photography, when the daguerreotype was in vogue, Sir J. Herschel, Dr. Draper, Messrs. Claudet, Fizeau, Becquerel and other eminent daguerreotypists had observed that if a sensitive plate were exposed to the spectrum after a short preliminary exposure to diffused daylight, the red rays exercised a negative effect by which the action of the white light was neutralised, and in this manner photographs had been obtained in which not only the rays in the extreme red just below the ordinarily visible spectrum could be distinctly seen, but also traces obtained of three or four groups of rays in the heat spectrum where it was ordinarily supposed no photographic action existed.

I therefore tried the effect of a short preliminary exposure to daylight with one of the blue-stained bromide plates prepared at the same time and in the same manner as the one on which no reversed action was apparent. On developing, the reversed action was well marked, as I had expected, and not only were the A and other lines in the red and yellow clearly to be seen as dark lines on a transparent ground, but the bands and lines in the extreme red below A were also distinctly visible and reversed, as will be seen in the two negatives I have the pleasure to exhibit this evening. One of them was taken with a very fine single-prism spectroscope kindly lent me by Mr. Pedler of the Presidency College and shows several images of spectra in which the lines in the extreme red are fairly distinct though faint. The other was taken with a Browning's direct-vision spectroscope, and on this plate the bleaching action is particularly well shown, not a trace of deposit remaining on a great part of the plate acted on by the red rays,

while the lines stand out clearly, though not in very good definition owing to my having used a rather large opening of the slit.

It will be observed also that the part of the spectrum acted upon by the blue and violet rays is also reversed, so that the whole spectrum is reversed from a little above  $H_2$  to below A. This action I have noticed on all dry bromide plates, both stained and unstained, and have frequently obtained very beautiful images of the lines between  $H_2$  and F on a perfectly clear ground. The effect appears to be chiefly caused by overexposure and may perhaps be partly due to the action of the alkaline developer.

As above stated, the reversing action of the red rays has been observed with daguerreotype plates and therefore I cannot claim to have made a discovery, but so far as I am aware the application of the principle to collodion photography is entirely new, and as it appears capable of an important practical application in spectroscopic photography, particularly in extending our knowledge of a part of the spectrum in which eye-observations can only be made with difficulty and under very favourable circumstances, I have thought it worth bringing to the notice of the Society and hope to be able to continue the investigations with still better results.

Capt. Waterhouse further remarked that these photographs had an additional interest from the fact that the lines in the extreme red had hitherto only been observed about sunrise and sunset and that according to Mr. J. B. N. Hennessey, who had made a very careful study of them at Mussooree in 1870, complete darkness prevailed at sun-high in the part of the spectrum in which they are situated. The photograph, however, which shows the lines with most distinctness was taken between 1 and 2 p. m. and the spectrum extends to a distance below A equal to that of the line C above it, or very considerably beyond the limits of Mr. Hennessey's map and of the earlier ones by Brewster and Gladstone.

The following papers were read :—

1. *On the S'ūlasūtras ; or Notes on the beginning of Geometry in India.*—  
By DR. G. THIBAUT, *Anglo-Sanskrit Professor, Banāras College.*

(Abstract.)

This paper, a portion of which was read by Dr. Thibaut at the last Oriental Congress, has been printed with numerous diagrams in No. III of Pt. I, of this year's Journal. Dr. Thibaut has published several of the *S'ūlasūtras* in the Banāras "Pandit."

Extracts from the paper were read by the Secretary.

2. *On a new species of Tupistra from Upper Tenasserim.*—By S. KURZ.

(Abstract.)

In this paper the author describes a second species of *Tupistra* under the name of *F. Stoliczkana*. It is one of the numerous valuable

plants collected for the author by the late Dr. Stoliczka and is remarkable for its stiff, robust erect spikes, those of *S. nutans* being comparatively slender and so much decurved that the fruits when ripe are usually found buried in the mould of the dark forests in which the plant grows.

The paper will appear in the Journal, Part II.

3. *List of Reptilia and Amphibia collected by the late Dr. Stoliczka in Kashmir, Ladák, Eastern Turkistan and Wakhán, with descriptions of new species.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

This paper contains a list of the Reptiles (lizards and snakes) and Amphibia, collected by the late Dr. Stoliczka, similar to the list of mammalia already published (J. A. S. B., 1875, p. 106). Owing in a great measure to the season of the year at which many of Dr. Stoliczka's journeys were made, and to the ground being covered with snow for months together in the regions traversed, and also in part to the poverty of the fauna, the number of species obtained is not large, and comprises 15 lizards, 9 snakes, and 4 Amphibia. Eight lizards (six of which appear to be undescribed) and two snakes were obtained in Eastern Turkestan around Yárkand and Káshghar. Of several of the species found large numbers were collected.

The following are the new species described :

*Stellio Stoliczkanus*, a slender form (inhabiting the open steppes) having the dorsal scales somewhat as in *S. Caucasicus*, but with fewer enlarged scales on the sides, no patch of thickened scales on the abdomen, and the tail scales scarcely exceeding in size those on the middle of the back. It probably resembles *S. Aralensis*, but the toes are not fringed as they are said to be in that species.

*Phrynocephalus axillaris*, near *P. maculatus*, but the limbs are rather shorter, the toes less fringed, and the colouration different. There is no black tip to the tail, nor red colour beneath the base of the tail, and there is always a red spot behind each axil.

*Gymnodactylus elongatus*, a peculiar elongate form, with the tail equal in length to the body and head, back with numerous large trihedral tubercles, tail not tuberculated, but with the posterior row of scales in each verticil enlarged and carinate ; præanal pores about five in number.

*G. microtis*, a small sandy coloured form, with a smooth tail, small tubercles on the back, and a very minute ear opening, probably allied to the species described by Pallas under the name of *Lacerta pipiens*.

*Eremias Yarkandensis*, allied to *E. cæruleo-ocellata*, to which it was referred by Dr. Anderson, but it appears more nearly allied to *E. multiocellata*, and it may perhaps be identical, though the description does not coin-

cide. The present species has the nasal shield not tumid, the dorsal scales almost without intervening granules, the scales on the anterior portion of the tail smooth as a rule, no azygos shield between the post-frontals, and the ventral scales in 14—16 oblique and about 30 transverse series.

*E. vermiculata*, a very elongate form, with the tail more than twice the length of the head and body, ventral shields in 16—20 oblique, and 36—41 transverse series, and supra-orbital shields surrounded by granules. Colour,—grey vermiculated with black.

All the above species were found in the plains of Eastern Turkestan.

The paper will appear in the Journal Part II, No. 3, 1875.

#### 4. *Description of twenty-one new Indian Plants.*—By S. KURZ.

(Abstract.)

The author describes the following new species.

*Zanthoxylon Andamanicum*, from the Andamans; *Aglaia paniculata*, from Pegu and Tenasserim; *Amoora lactescens* and *Amoora dysoxylodes*, from Martaban; *Walsura oxycarpa*, from the Andamans; *Daphniphylopsis capitata*, from the Himalayas in Sikkim and Martaban; *Natsiatopsis thunbergiæfolia*, from Ava; *Ilex Sikkimensis* from the Sikkim Himalayas; *Gymnosporia Thomsoni*, from Sikkim and Bhutân; *Gymnosporia Gibsoni*, from the Bombay Presidency; *Lophopetalum fuscescens*, from Singapore; *Salacia Jenkinsii*, from Assam; *Salacia platyphylla*, and *Hippocratea*, *Nicobarica*, from the Nicobars; *Vitis costata*, from Pegu; *Vitis Neurosa* from the Khásia Hills; *Vitis Vicaryana*, from Dehra Dún; *Sapindus tomentosus*, from Ava, and Khakyen Hills; *Sapindus microcarpus*, from Siam; *Pometia macrocarpa*, from Malacca; *Dalbergia stenocarpa*, from Sikkim and Pankabári.

The paper will be published in Part II of the Journal.

#### 5. *Description of new species of Oaks.*—By S. KURZ.

(Abstract.)

The author describes some new species of oak—*Quercus mespilifolia*, from the Arracan Hills; *Q. xylocarpus*, from the Arracan Hills and Asám; *Q. olla*, from Asám and *Q. pachyphylla*, from the forests of Tounglú and the Phallút mountains.

The paper will be published in Part II, of the Journal.

The following communications have been received—

1. *Rough Notes on the Angami Nágas and their Languages.*—By Captain JOHN BUTLER, B. S. C., Political Agent, Nágá Hills, Asám.
2. *An account of the Maiwár Bhils.*—By T. H. HENDLEY, Surgeon, Jaipur Agency, Rájputaná.



## LIBRARY.

The following additions have been made to the Library since the meeting held in August last.

*Presentations.*

\*\*\* Names of Donors in capitals.

Proceedings of the Royal Society. Vol. XXIII, No. 162.

*D. Ferrier.*—The Croonian Lecture, Experiments on the Brain of Monkeys. *Col. J. T. Smith.*—On the Liqutation of Alloys of Silver and Copper. *J. Williams.*—Note on the Discharge of Ova, and its relation in point of Time to Menstruation. *Sir W. Thomson.*—Electrodynamic Qualities of Metals. Electrolytic Conduction in Solids. *W. C. Roberts.*—On the Liqutation, Fusibility and Density of certain Alloys of Silver and Copper.

ROYAL SOCIETY, LONDON.

Proceedings of the Royal Geographical Society. Vol. XIX., Nos. 5 and 6.

No. 5. *Markham.*—Travels in Great Tibet, and Trade between Tibet and Bengal.

ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Journal of the Statistical Society. Vol. XXXVIII., Pt. 2., June, 1875.

STATISTICAL SOCIETY.

Proceedings of the Institution of Mechanical Engineers. April, 1875.

*Major Beaumont.*—On Rock Boring by the Diamond Drill, and recent applications of the process.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Journal of the Anthropological Institute of Great Britian and Ireland. Vol. V. No. 1, July, 1875.

*Lieut. C. C. de Crespigny.*—The Milanows of Borneo.—*Major Godwin-Austen.* Further Notes on the Rude Stone Monuments of the Khasi Hill Tribes.

ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Journal of the Chemical Society. Vol. XIII. May, June, and July, 1875.

May. *J. L. W. Thudichum.*—Further Researches on Bilirubin and its Compounds.

June. *J. Clerk-Maxwell.*—On the Dynamical Evidence of the Molecular Constitution of Matter.

CHEMICAL SOCIETY, LONDON.

Proceedings of the Zoological Society of London, Pt. IV. 1874, Pt. I. 1875.

Pt. IV. *E. Swinhoe.*—Letter respecting some Bats obtained in China. *F. Moore.*—Description of New Asiatic *Lepidoptera.*

Pt. I. *Dr. G. Bennett.*—Letter from, concerning the occurrence of an Indian Beetle (*Chrysocroa ocellata*) in the Bay of Bengal. *A. Anderson.*—Corrections of and additions to "Raptorial Birds of North-Western India. *Major Godwin-Austen.*—Supplementary Notes on the Species of *Helicidae* of the Subgenus *Plectopylis.*

Transactions of the Zoological Society of London. Vol. IX. Pts. 1, 2, 3, 1875.

Pt. 2. *Arthur Viscount Walden*.—A List of the Birds known to inhabit the Philippine Archipelago.

#### ZOOLOGICAL SOCIETY OF LONDON.

Journal of the Royal Geographical Society. Vol. 44, 1874.

*S. W. Bushell*.—Notes of a journey outside the Great Wall of China. *G. Phillips*.—Notes on Southern Mangi. *C. Millingen*.—Notes of a journey in Yemen. *R. G. Watson*.—Notes of a journey in the Island of Yezo in 1873; and on the Progress of Geography in Japan. *Major B. Lovett*.—Narrative of a visit to the Kuh-i-Khwajah in Sistan. *Captain S. B. Miles*.—Journey from Gwâdur to Karâchi. *Major-General Sir F. Goldsmid*.—Notes on recent Persian Travel. *E. Delmar Morgan*.—Col. Stebnitzky's Report on his journey in 1872 in Central and Southern Turkomania.

#### ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Minutes of Proceedings of the Institute of Civil Engineers. Vol. XL, 1874-75, Pt. II.

#### INSTITUTE OF CIVIL ENGINEERS.

Transactions of the Asiatic Society of Japan from October, 1872 to July, 1874.

#### ASIATIC SOCIETY OF JAPAN.

Transactions of the Archæological Society of Agra. January to June, 1875.

#### ARCHÆOLOGICAL SOCIETY OF AGRA.

Bôrô-Bodour dans l'île de Java, par le Dr. C. Leemans, with drawings and Photographs illustrating the work.

#### BATAVIAN SOCIETY OF ARTS AND SCIENCES.

Cobden Club Essays. Local Government and Taxation. Report of the Proceedings at the dinner of the Cobden Club, June, 1873 and July, 1874.

#### COBDEN CLUB.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Vol. 29, Pt. I.

*A. Bastian*.—Die Verkottungstheorien der Buddhisten. *Th. Nöldeke*.—Zur Geschichte der Araber im 1. Jahrh. d. H. aus Syrischen Quellen. *Ed. Sachau*.—Algebraisches über das Schach bei Birûnî.

#### GERMAN ORIENTAL SOCIETY.

Sitzungsberichte der Philosophisch-philologischen und historischen Classe der K. B. Akademie der Wissenschaften. Pts. I. and II. 1874.

Mathematisch-physikalischen Classe. Pt. III. 1874.

Pt. II. *V. Schlagintweit-Sakulinski*: Ueber das Genus Rosa in Hochasien und über Rosenwasser und Rosenöl.

*Serjania Sapindacearum* genus Monographice Descriptum, von L. Radlkofer.

Ueber den religiösen Charakter des griechischen Mythos, von Dr. Conrad Bursian.

ROYAL BAVARIAN ACADEMY OF SCIENCES, MUNICH.

Ueber die Wasserabnahme in den Quellen Flüssen und Strömen bei gleichzeitiger Steigerung der Hochwasser in den Culturländern, von Gustav Wex.

ROYAL ACADEMY OF SCIENCES, VIENNA.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin. April and May, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Oesterreichische Monatsschrift für den Orient. Nos. 7, 8 and 9, July, August and September, 1875.

No. 9. Dr. J. Chavanne.—Die projectirten internationalen Schienenwege nach Indien und China.—Aerztliche Ansicht über die Colonisation Niederländisch-Indiens.

ORIENTAL MUSEUM OF VIENNA.

Mittheilungen der Deutschen Gesellschaft für Natur und Volkerkunde Ostasien's, Pt. 7. June, 1875.

GERMAN JAPAN SOCIETY OF EASTERN ASIA.

Bulletin de la Société de Géographie, June and August, 1875.

GEOGRAPHICAL SOCIETY OF PARIS.

Bulletin de la Société d'Anthropologie der Paris, Tome. X. Mars à Mai, 1875.

Morice.—Sur l'anthropologie de l'Indo-Chine.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Memoires de la Société Royale des Antiquaires du Nord. Nouvelle Série, 1873-74.

Aarboger for Nordisk Oldkyndighed og Historie. Hefte I to IV, 1874.

Tillæg til Aarboger for Nordisk Oldkyndighed og Histoire. Aargang, 1873.

Islendinga Sögur. Tredie Bind,—1875.

Njála.

SOCIETY OF NORTHERN ANTIQUARIES, COPENHAGEN.

Mémoires de la Société Royale des Sciences de Liège, 2<sup>e</sup> Série. Tome IV and V. 1873-74.

Tome V. Candèz.—Insectes recueillis au Japon par M. G. Lewis, pendant les années 1869—1871.—Elatérides.

ROYAL SOCIETY OF SCIENCES, LIE'GE.

Bulletin de la Société Impériale des Naturalistes de Moscou. No. 4, 1874.

K. Motschoulsky.—Énumération des nouvelles espèces de Coléoptères rapportés de ses voyages.

Atti della Societa Toscana di Scienze Naturali residente in Pisa. Vol. I, fasc., 1 and 2, 1875.

TUSCAN SOCIETY OF NATURAL SCIENCES, PISA.

A Comparative Grammar of the Modern Aryan Languages of India, by John Beames, B. C. S.

AUTHOR.

The Royal Tiger of Bengal, by J. Fayer, M. D.

AUTHOR.

L' Art Khmer, par le Comte de Croizier.

AUTHOR.

Rig-Veda Sanhita, the first and second Adhyayas of the First Ashtaka, with Notes and Explanations, and an Introductory Essay on the Study of the Vedas, by the Rev. K. M. Banerjea.

AUTHOR.

Account of the Survey Operations in connection with the Mission to Yarkand and Kashgar in 1873-74, by Capt. H. Trotter, R. E.

AUTHOR.

Guldmynten fra Aak ag C. A. Holmboe.

AUTHOR.

Corrections of, and additions to "Raptorial Birds of North-Western India," and,—On the Nidification of certain Indian Birds, by A. Anderson.

AUTHOR.

Traité des Berakthoth du Talmud de Jérusalem et du Talmud de Babylone, par Moïse Schwab.

Venisamhâra; Die Ehrenrettung der Königin, von Julius Grill.

Ist in der indogermanischen Grundsprache ein nominales Suffix ia oder Statt dessen ya auzusetzen?

Ueber die Entstehung und die Formen des indogermanischen Optativ (Potential), von Theodor Benfey.

H. BLOCHMANN, M. A.

The Seventeenth Anniversary Report of the Burra Bazar Family Literary Club.

THE SECRETARY.

The Calcutta Journal of Medicine, Nos. 10 to 12, October to December, 1874, edited by Mahendra Lâl Sircâr, M. D.

EDITOR.

Instructions for the Electrical Testing of Lines and Offices, by Louis Schwendler.

AUTHOR.

The Countess of Chinchon and the Chinchona Genus, by Clements R. Markham.

W. T. BLANFORD, Esq.

Report of the Commissioner of Agriculture for 1873.

DEPT. OF AGRICULTURE, U. S. OF AMERICA.

An Essay concerning important Physical Features exhibited in the Valley of the Minnesota River, by Major G. K. Warren.

ENGINEER DEPT. U. S. ARMY.

On Leprosy and Elephantiasis, by H. Vandyke Carter, M. D.

A Grammar of the Arabic Language, by W. Wright, D. D., Vol. II.

Yajur Veda Sanhita, Pts. 8 to 12.

HOME DEPT. GOVT. OF INDIA.

Records of the Geological Survey of India, Vol. VIII. Pt. 3, 1875.

DEPT. OF REVENUE, AGRICULTURE, AND COMMERCE.

Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India, by Col. J. T. Walker, R. E., vol. II., (2 copies).

SUPERINTENDENT OF THE SURVEY.

Annals of Indian Administration in the year 1873-74, edited by G. Easton.

Report of the Sanitary Commissioner for Bengal for 1874, by Surgeon-Major J. M. Coates.

Report on the Calcutta Medical Institutions for 1874, by the same.

GOVERNMENT OF BENGAL.

Statistical, Descriptive and Historical Account of the N. W. Provinces of India, by E. T. Atkinson. Vol. II., Meerut Division, Pt. I.

GOVERNMENT OF THE NORTH-WESTERN PROVINCES OF INDIA.

Report on the Sanitary Administration of the Punjab for 1874.

GOVERNMENT OF THE PUNJAB.

Annual Report of the Sanitary Commissioner of the Central Provinces for 1874.

Report, with the Chief Commissioner's Review, on the Forest Administration of the Central Provinces for 1874-75.

Report, with the Chief Commissioner's Review, on Education in the Central Provinces for 1874-75.

Report on the Administration of the Land Revenue Department of the Central Provinces for 1874-75.

Report on the Trade and Resources of the Central Provinces for 1874-75.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report on Public Instruction in the Madras Presidency for 1873-74.

GOVERNMENT OF MADRAS.

Nyāyakosa, or Dictionary of the Technical Terms of the Nyāya Philosophy, by Bhimāchārya Jhalakīkar.

Bombay Sanskrit Series, No. XIV, Vikramānkadevacharita.

DEPT. OF PUBLIC INSTRUCTION, BOMBAY.

Statistical and Historical Account of the District of Thayetmyo, Pegu Division of British Burma, with Maps, by Lt.-Col. H. A. Browne, Deputy Commissioner of British Burma.

*Purchase.*

Quarterly Journal of Microscopical Science, No. 59, July, 1875.

*F. M. Balfour.*—A Comparison of the Early Stages in the Development of Vertebrates. *A. A. W. Hubrecht.*—Some Remarks about the Minute Anatomy of Mediterranean Nemerteans. *E. Ray Lankester.*—On some new Points in the Structure of *Amphioxus* and their Bearing on the Morphology of *Vertebrata*. *T. R. Lewis.*—On Nematode *Hæmatozoa* in the Dog.

The Numismatic Chronicle and Journal of the Numismatic Society. 1875, Pt. I.

*W. S. W. Faux.*—On an Unique Coin of Platon, a King of Bactriana.

The London, Edinburgh, and Dublin Philosophical Magazine, Vol. 50, Nos. 328, 329.

No. 328. *R. Mallet.*—On the Temperature attainable by Rock-crushing and its Consequences. *H. Bauerman.*—An Experiment for showing the Electric Conductivity of various forms of Carbon. *Capt. Abney.*—On Photographic Irradiation. *G. J. Woodward.*—On an Apparatus to illustrate the Formation of Volcanic Cones.

No. 329. *W. M. Watts.*—On a New Form of Micrometer for use in Spectroscopic Analysis. *C. Tomlinson.*—On some Phenomena connected with the Boiling of Liquids.

The Quarterly Journal of Science, No. 47, July, 1875.

The Mechanical action of Light.

Journal of the Society of Arts, Vol. XXIII, Nos. 1177 to 1184.

No. 1177. *Rev. J. Long.*—The Russian Advance in Central Asia, in its Commercial and Social Aspects towards India and the East. The Navigation of the Oxus.

No. 1181. Concentrated Beer.—The Production of India-rubber. Indian Agriculture.

The Annals and Magazine of Natural History, Vol. 16, Nos. 91, 92.

No. 91. *E. Metschnikoff.*—On the Development of *Caleispongia*.

No. 92. *M. A. Giard.*—On the Position of *Sagitta*, and on the Convergence of Types by Pelagic Life. *A. G. Butler.*—List of the Species of the Homopterous Genus *Hemisphaerius*, with Descriptions of new Forms in the Collection of the British Museum. *E. A. Smith.*—A List of the *Gasteropoda* collected in Japanese Seas by Commander H. C. St. John, R. N. *E. J. Miers.*—Description of three Additional Species of *Crustacea* from Kerguelen's Land and Crozet Island, with Remarks upon the Genus *Pazamara*. *J. Wood-Mason.*—On the Occurrence of a Superorbital chain of Bones in the *Arboricola* (Wood-Partridges). *M. A. Villot.*—On the Helminthological Fauna of the Coasts of Brittany.

The Westminster Review. No. 95, July, 1875.

The Quarterly Review. No. 227, July, 1875.

The Edinburgh Review. No. 289, July, 1875.

The Messenger of Mathematics. Nos. 45 to 51, January to July, 1875.

The American Journal of Science and Arts. Vol. IX, Nos. 53, 54, Vol. X, No. 55.

The Academy, Nos. 167 to 176, July to Sept. 1875.

The Indian Medical Gazette, Vol. X, Nos. 9, 10.

Stray Feathers. Vol. III., No. 4, 1875.

The Calcutta Review, No. 122, October, 1875.

Revue de Philologie. Tome 1, No. 4.

Revue Critique d'Histoire et de Littérature, Nos. 23 to 30, June July, 1875.

Revue Archéologique. No. VI. Juin, 1875.

Revue et Magasin de Zoologie, No. 3.

Revue des Deux Mondes, Juin 15, 1875, Juillet 1, et 15, 1875.

Journal des Savants. Mai, Juin, 1875.

Mai. *B. Saint-Hilaire*.—La langue et la littérature Hindoustanie de 1850 à 1869 et 1874.

Comptes Rendus, Tome 70, Nos. 21 to 25, Tome 71, Nos. 1 to 3.

No. 21. *M. V. Feltz*.—Étude expérimentale sur le principe toxique du sang putréfié. *M. E. Bouchut*.—Nouvelle méthode de traitement du rhumatisme cérébral par l'hydrate de chloral.

No. 22. *M. Giraud-Teulon*.—Sur une nouvelle méthode et sur un nouvel instrument de télémétrie (mesure rapide des distances).

No. 23. *M. Fizeau*.—Avis de la Commission des paratonnerres sur une disposition nouvelle proposée pour les magasins à poudre. *M. L. Fautrat*.—Influence des forêts sur le climat.

No. 25. *M. Janssen*.—Observations magnétiques exécutées dans la presqu'île de Malacca. *M. P. Bert*.—Influence de l'air comprimé sur les fermentations.

No. 2. *M. H. Pestin*.—Théorie des tempêtes : conclusions.

Gottingische gelehrte Anzeigen, Nos. 19 to 28.

Nachrichten. Nos. 12 to 17.

Jahresbericht über die Fortschritte der Chemie, Heft, 2, für 1873.

Annalen der Physik und Chemie. Nos. 7 and 8, 1875.

No. 7. *A. Kundt* und *E. Warburg*.—Ueber Reibung und Wärmeleitung verdünnter Gase. *R. Bunsen (Schluss)*.—Spectral analytische Untersuchungen. *J. L. Mooney*.—Ueber die Diathermansie von feuchter Luft. *L. Boltzmann*.—Experimentelle Bestimmung der Dielectricitätsconstante einiger Gase. *O. Schott*.—Ueber die Krystallisationsproducte des gewöhnlichen Glases. *F. Exner (Schluss)*.—Ueber den Durchgang der Gase durch Flüssigkeitslamellen. *Bresina*.—Ueber eine einfache Methode zur Vergleichung zweier tönenden Luftsäulen durch schwingende Flammen. *N. Schiller* und *R. Colley*.—Ein Versuch über die elektrodynamische Wirkung des Polarisationsstroms. *J. Jamin*.—Ein Sonderbarer Fall von Magnetisirung. *W. Beetz*.—Ueber die magnetischen Eigenschaften des Elektrolytisch dergestellten Eisens. *B. Delachanal* und *A. Mermet*.—Spectro-elektrische Röhre oder Fulgurator ein zur Beobachtung der Spectren metallischer Lösungen dienender Apparat. *K. Heumann*.—Eine Entgegnung. *E. Hagenbach*.—Plötzliches Springen von Gläsern.

No. 8. *C. Müller*.—Untersuchung über die Tonhöhen der Transversalschwingungen poröser Gypsstäbe wenn dieselben mit verschiedenen Flüssigkeiten getränkt sind. *A. Kundt und E. Warburg*.—Ueber Reibung und Wärmeleitung verdünnter Gase. *H. Morton*.—Fluoreszenzverhältnisse gewisser Kohlenwasserstoffverbindungen in den Steinkohlen—und Petroleumdestillaten. *F. Kohlrausch*.—Bemerkungen zu Hr. Neesen's Beobachtung über die elastische Nachwirkung. *A. Streintz*.—Erwiderung auf die "Bemerkungen" des Prof. O. E. Meyer zu meiner Abhandlung: Ueber die Dämpfung der Torsionsschwingungen von Drähten. *A. Oberbeck*.—Ueber eine Methode, die Leitungsfähigkeit von Flüssigkeiten für die Elektrizität zu bestimmen. *L. Sauer*.—Experimente über die Sichtbarkeit ultra-violetter Strahlen. *H. Schneebeli*.—Ueber die Anziehungs—und die Abstofsungszeit der Elektromagnete. *F. Schaack*.—Zur construction von Blitzableitern für Telegraphen—Leitungen. *P. La-Cour*.—Ueber die Anwendung der Stimmgabel in der elektrischen Telegraphie. *Hillebrand und Norton*.—Elektrolytische Abscheidung des Cers, Lanthans und Didyms. *W. Holtz*.—Ueber die Umwandlung elektrischer Ströme niederer Spannung in disruptive Entladungen höherer Spannung. Nachträgliche Notiz über eine neue elektrische Röhre, von Demselben.

Large Game Shooting in Thibet and the North-West, by A. A. A. Kinloch.

A year on the Punjab Frontier, in 1849, Vols. I and II., by Major, H. B. Edwards.

India Tracts, by J. Z. Holwell.

Encyclopædia Britannica, 9th Edition, Vols. I and II.

A brief History of the Bhopal Principality in Central India, by Major W. Hough.

A Comparative Grammar of the Dravidian or South-Indian Family of Languages, by the Rev. R. Caldwell.

Hints to Travellers, published by the Royal Geographical Society of London.

Anthropological Notes and Queries, published by the British Association.

### *Exchange.*

Nature. Vol. 12, Nos. 297 to 307, July to September, 1875.

The Geographical Magazine. Vol. II., No. IX.

Capt. H. Trotter, R. E.—Notes on Recent Explorations in Central Asia. The Amu Darya Expedition.

The Athenæum. Pts. 569 to 571, May to July, 1875.

The Indian Antiquary. Vol. IV. Pts. 46 and 47, September and October, 1875.

Pt. 47. *H. Blochmann*.—Eight Arabic and Persian Inscriptions from Ahmadâbâd. *E. Rehatsek*.—Biography of Jellâl-al-Din Rûmi. *J. Beames*.—On the Age and Country of Bidyâ-Pati. *M. J. Walkhouse*.—Archæological Notes. Notes on the Antiquities found in parts of Upper Godâvari and Krishna Districts.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 1st December, 1875, at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From the Government of India, Home Dept., a set of 67 photographs of the ancient Architectural remains of Chutiá-Nágpur, taken by T. F. Peppé, Esq.

2. From the Director of the Imperial Botanical Garden of St. Petersburg, Trudbi, Imperatorskago Petersburgkago Botanischekago, Soda. Tome III, Pt. II.

3. From the Government of Bengal, a copy of the first volume of Dr. Hooker's Flora of British India.

4. From the Italian Society of Spectroscopists, through Prof. Tacchini, several numbers of their Journal.

The following gentleman, duly, proposed and seconded at the last meeting, was balloted for and elected an ordinary member :—

J. B. Knight, Esq.

The Rev. J. D. Bate, Allahabad, and Maulawí Abdul Hai, Calcutta, duly proposed and seconded at the last meeting, were balloted for and elected Associate Members.

The following are candidates for ballot at the next meeting :—

W. McGregor, Esq., Supdt. Indian Telegraphs, Akyab, proposed by Mr. H. Blochmann, seconded by Col. H. Hyde, R. E.

Ottokar Feistmantel, Esq., M. D., Geological Survey, Calcutta, proposed by Mr. H. Blochmann, seconded by Dr. T. Oldham.

The following gentlemen have intimated their desire to withdraw from the Society—

Thos. W. Bourne, Esq., A. D. B. Gomes, Esq., Rájá Chundranáth Rai, of Nator, C. B. Clarke, Esq.

Mr. Blochmann laid on the table his readings and translations of several Arabic and Persian Inscriptions from Dillí.

A few months ago, Mr. J. G. Delmerick, Dillí, presented to the Society a batch of very excellent rubbings taken by him at various places in and about Dillí, and added the request that the readings and translations be published in the Society's Journal or Proceedings. Mr. Blochmann has read the greater part of them, and intends publishing them from time to time in the Proceedings. Mr. Delmerick has kindly promised to send another batch from Hásí and Hicár.

## I.

From the *Mazár*, or mausoleum, at Dáúd Sarái, 11 miles from Sháh-jahánábád, near the Metcalf Estate and the Kutb Minár.

بناء این عمارت گنبد در عهد سلطان الاعظم ابوالمظفر سکندر سلطان خلد الله  
ملکه و سلطانه بانع گنبد شیخ علاؤ الدین نور تاج شیخ نبسه قطب العالم شیخ  
فرید شکر گنج ماه محرم سنه ثلث عشر و تسعمایه

The building of this dome (took place) in the reign of the great Sulṭān Abul Muzaffar Sikandar, the king,—May God perpetuate his kingdom and rule! The builder of the dome is Shaik 'Aláuddín (son of) Núr Tájj Shaikh, a descendant of the pole of the world Shaikh Farid Shakkarganj,\* in Muharram, 913 [May, 1517].

The builder is again mentioned in Inscription IV.

## II.

From the Rauzah of Muhammad Sharíf i Balkhí, outside Nizámuddín's well, west; 2 ft. by 4 in.

وفات امیر المعظم المکرم المرحوم مغفور فی روضه امیر محمد شریف بلخی  
بقاریع ست ماه ربیع الآخر سنه ثمان و ثلاثین و تسعمایه

The death of the great generous Amír, who is now pardoned and forgiven in the gardens of paradise, Muhammad Sharíf of Balkh, (took place) on the 6th Rabi' II., 938 [17th November, 1531].

## III.

From the *Mihráb* of the mosque outside the gate of Nizámuddín's well, north; 1 ft. by 1 ft. 1 in.

در عهد دولت محمد همایون پادشاه غازی این مسجد بنا کرد امیدوار رحمت  
کردگار قاسم یساول بن مولانا علی ختلانی بناریع دوم شهر شعبان المعظم سنه ۹۴۰

This mosque was built during the reign of Muhammad Humá'ún Pádisháhi Ghází, by Kásim Yasáwul [court-usher], son of Mauláná 'Alí of Khatlán [in Badakhshán], who hopes in the mercy of the Almighty, on the 2nd Sha'bán, 940 [16th February, 1534].

\* The great saint of Dípálpúr (Panjáb).

## IV.

From the second Mazár at Dáúd Sarái; *vide* Inscr. I. Beautifully cut, 2 ft. 8 in. by 1½ ft.

بني هذا الخانقاه باسم قطب العالم شيخ فريد الدين گنج شكري زمان سلطان  
الاعظم نصير الدين محمد همايون پادشاه غازي وكان بانيه علا نور تاج نبسه شيخ  
سنه احدى واربعين وتسعمائه  
كتبه العبد حسين احمد

This prayer-room was built in the name of (in memory of) the pole of the world, Shaikh Farid uddin Ganj-i-Shakkar, in the time of the great king Naqiruddin Muhammad Humáyún Pádisháh-i-Ghází. And its builder is 'Alá (son of) Núr Táji, a descendant of the Shaikh, in 941 H. [A. D., 1534-35]. Written by the humble Husain Ahmad.

## V.

From the gate east of Kutb Sáhíb. Legible, but clumsy characters; 1 ft. 8 in. by 1 ft. 2 in. Metre, *Khafí'*.

در زمان شه جهان اسلام	شد بلند این در سپهر جناب
گرچه صد باب هست جنت را	لیس باب بمثل هذا الباب
کرد شیخ بنا که در بابش	یوسف ثانی از حق است خطاب
چون ز تاریخ و نام کردم عرض	گفت درگاه خواجۀ اقطاب

1. In the reign of the king of the Muhammadan world, [Islám Sháh] this gate, which is the threshold of heaven, was erected.

2. Though paradise have a hundred gates, it has no gate like this gate.

3. A Shaikh built it to whom the title of 'a second Yúsuf' may justly be applied.

4. When I asked him for the chronogram and the name (of the structure), he said, (the date and the name are given in the words) '*Durgáh i Khwájah i Aká'd'*, 'the shrines of the saintly Khwájah.'

The letters added up give A. H. 958, or A. D. 1551.

## VI.

From a tomb in the courtyard (*gahn*) of Nizámuddin; 1 ft. 2 in. by 5 in. Metre, *khafí'*—

از جهان میرزا مقیم چورفت نهصد و شصت و هفت شد تاریخ

It was in 967 H. [1559-60, A. D.] that Mírzá Mukím left the world.

## VII.

From a child's tomb inside the Rauzah of Mírzá Mukím (mentioned in the preceding), opposite Nizámuddin's shrine. 6 ft. 8 in. by 3½ in. *Rubá'i* metre.

افسوس که شد نهان بشهردهلی مایه که محل طالعش کابل شد  
 آن تازه نهال گلشن حسن و جمال بگذاشت جهان وقایع بالکل شد  
 تاریخ وفات آن گل آمد از غیب برپاد زگلبن مراد آن گل شد  
 وفات ابو الفضایل بن سید مراد در سنه ۹۶۸

1. Alas! In the city of Dihli a moon set which had risen in Kábul.
2. This fresh plant of the flower-bed of beauty and comeliness left this world and vanished altogether.

3. The chronogram of the death of this rose came from the unseen world, 'The wind scattered that rose of Murád's stem.'

The death of Abul Fazáil, son of Sayyid Murád, (took place) in 968 [A. D. 1560-61].

### VIII.

From the courtyard of Amír Khusráu's Tomb. 1 ft. by 5 in.

وفات مرحومه سلیمه سلطان بنت امیر شهاب جامی تاریخ پنج شهر محرم  
 الحرام سنه نهصد و شصت و هشت \*

The death of the pardoned Salíma h Sultán, daughter of the Amír Shiháb of Jámi, (took place) on the 5th Muharram, 968 [26th September, 1569].

Amír Shiháb was governor of Dihlí in the beginning of Akbar's reign. His wife, Bába Aghá was related to Akbar's mother. For his biography, *vide* my *Ain Translation*, Vol. I., p. 332.

Letters were read—

1. From the Asst. Secretary to the Government of India, Foreign Dept., forwarding the following copy of a paper by Dr. da Cunha of the Bombay Branch of the Royal Asiatic Society, relating to some Portuguese Inscriptions which were discovered on the walls of the Fort of Mombassa, by Major C. B. Euan Smith, C. S. I., late Offg. Political Agent at Zanzibar.

(Copy.)

#### *Translation of the Inscription, No. I.*

In the reign of the King d' Phelipe II., Antonio de Sousa Godinho was by his order commanded to place this inscription on the new fortress of the island of Mombaça in the month of April of 1593, at the time when Mathias d'Albuquerque was Viceroy of India. Being Matheus Mendes de Vasconceillor Chief Captain of the Coast of the Sea (Melindi), this fortress was commanded to be built with the assistance of the Engineer from India, Master Joao Bautista Cairato, served by masons Manoel de Sousa and Ascanio Asis Rodrigues.

*Remarks.*—The above inscription has been engraven in a very confused style. Some words are not only shortened into one letter or two or

otherwise mutilated, and others disfigured by misspelling, but are most unsystematically transposed. Add to this the vacant spaces in the middle and beginning of the inscription where letters are entirely worn out, and the difficulties of their decipherment become apparent. Although these lacunæ have been filled up, the substitution of words is but a mere guess-work. Fortunately there are historical grounds for these conjectures.

A transcript of the inscription from its almost unintelligible inscriptionary writing of the sixteenth century into correct and modern Portuguese would run thus:—Reinando (o mui alto e poderoso or o serenissimo)\* Rei d' Phelipe II. mandon a Antonio de Sousa Godinho por sen mandado por (esta) ombreira† n'esta fortaleza nova da ilha de Mombaça ao mez d' Abril de 1593 (no tempo) em (que era) Vicè-rei da India Mathias d'Albuquerque (Esendo) Matheus Mendes (de Vasconcillor Capitao mor) da costa do mar de *Melindi* mandon fazer esta fortaleza (Ajudado pelo Engenheiro) da India (mestre Joao) Bautista Cairato servindo de (pedreirin Manoel) de Sousa e (Ascanio Asis) Rodrigues. The parentheses above mark the vacant spaces which have been filled up.

The facts here recorded are, that in the reign of the King Phelipe II. of Spain and I. of Portugal, which lasted from 1580 to 1598,‡ when Mathias d'Albuquerque was Viceroy of India and whose Viceroyalty continued from 1591 to 1597§, Antonio de Sousa Godinho, who was the second Governor of Mombaza||, was commanded by the King to place the above inscription dated 1593 on the door-post of the fortress newly built in the island of Mombaza, while Matheus Mendes de Vasconcillor was the Chief Captain of the coast of Malindi and also the first Governor of Mombaza¶ with the assistance of an Engineer, famous in those times in India, by name Joao Baptista Cairato, who was charged with the building of the fortress.\*\*

Here all facts coincide and the date of 1593, so clearly given, is really the key to the decipherment of this rather problematical inscription. The only doubt that may be brought forward respecting the right interpreta-

\* It was usual among the Portuguese in the epoch this inscription refers to to place the words *o mui alto e poderoso* or *o serenissimo*, meaning 'the most high and powerful' or 'the most serene' before the names of Kings, a fact attested to by the existing inscriptions of the coasts of Guzerat and Kaskan. One of these designations, besides, would exactly fill up the lacuna that precedes the name of the King d' Phelipe II.

† The word *ombreira*, which simply means 'door post' stands here for 'a door post with an inscription.'

‡ Dic. Hist. Capt. Novo Goa (1848) p. 108.

§ Borg. Hist. de Goa Idem (1858) p. 41.

|| Arch. Port. Orient. Idem (1861) Fasc. 3, pt. II, doc. 206, 111.

¶ Arch. Port. Orient. *ut supra* doc. 77, XXV., 140, XXVIII., 162, 111, 20611, 244, XIV.

\*\* Ibid doc. 76 to IX.

tion of the words, must be referable to the names of the Governor, who was commanded to fix the inscription and of the two masons who built the fortress. The former is solved by consulting the documents given in the foot note, the latter are scarcely of any historical importance.

*Translation of the Inscription, No. II.*

(In the year 16)48 John da Silva de Menezes entered this fortress and finding it much damaged, hastened to repair soldiers' lodgings, three magazines and one hospital, and commanded to rebuild the bastion 'Cavaleiro' and name it 'St. Antonio.'

*Remarks.* This inscription is far clearer than the No. I. It indicates plainly the advances the Portuguese artist had made during the fifty years elapsed between the two inscriptions. Its equivalent in modern Portuguese would run thus:—(Ens o anno de 16)48 reio entrar (Joao) da Silva de Menezes (nesta) forteleza, e achanob a mui damnificada traton do reparo de cazas de Soldados e tres almazes (armazens) a una caza de hospital. E mandon refazer este baluarte 'Cavaleiro' por nome S. Antonio.

The year is evidently 1698, for it was then that the Viceroy of India Joao da Silva de Menezes paid a visit to the island of Mombaza.

Of the three blasons or arms in the N. W., S. W. and S. E. corners the first to the left, *i. e.* the N. W. corner, are the Royal Arms of Portugal. The next two are private ones, belonging most probably to the Governor or Captains of Mombaza, whose names are given as R. Alves Alberís and Paulo Matheus.

The arms of the Fidalgos of Portugal are not unfrequently seen engraven by the side of those of their Kings, the old Fort of Diu is an instance of this. The cross (generally a Maltese one) is often engraven by the side of the Royal Arms, and is known as the cross of the King d' Manuel the fortunate. It is either placed on one side of the arms, with an armillary sphere or globe on the opposite side, as still observed on the gateway of the citadel of Bassein, or above the arms with the sphere on one side and a little below it, and three arrows tied together on the other, as in the ruined Fort of Chaul.

The two inscriptions above, with the one given by Rev. G. P. Badger,\* and the landmark described in his report† by Dr. Kirk, who visited it on the 14th October, 1873, on the coast of Malindi, where it was first placed by Vasco da Gama on his first voyage round the Cape, and which has undergone the vicissitudes of being often removed and transplanted by

\* Introduction to the Travels of Ludovico di Varthema p. CIX. The inscription is dated 1635 and is said to have been discovered by Dr. Krapf in the fortress of Mombaza.

† This Report is published in the Bombay Gazette, 22nd January, 1874.

the native King\* make up the sum of all that has of late been known of the remains of the Portuguese monuments on the Coast of Zanzibar.

(Sd.) J. GERBON DA CUNHA.

*Bombay, 25th September, 1875.*

*Translation.*

(a.)

The inscriptions in the three compartments.

Inscriptions over the inner door (1) are quite unintelligible. The name India occurs in the second, in the third there are\*

(a.)

\* the equivalents of by his order.

(Por seu mandado) 1593 and the

the figures. names.

Albuquerque Baptis Tacarato and Rodrigues.

(On the Commandant's House.)

(1) \*\*  
(a break)

(1) \* 48. Da Silva de Menezes entered the Fortress finding it \*\*\* dilapidated (he) undertook to have repairs made to the Soldiers' Houses (Barracks) and three Store houses and an Hospital and caused the inscription to be made. Knight by name St. Antonio.

(Crests.)

"	"	"
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R. Alves Palow  
Alberts. Mathews.

Cross.

"

(True copy),

(Sd.) A. CARSON,  
*Supdt.*

(True translation),

(Sd.) ERNEST MENESSEE,  
*Portuguese Translator to Govt.*

*Extract from a letter from H. M.'s Political Agent and Consul General, Zanzibar, to the Secretary to the Government of India, Foreign Department, No. 76, dated Zanzibar, 31st July, 1875.*

Para. 6.

"I took this opportunity of requesting permission to have copied the few Portuguese inscriptions which are still to be found upon the walls of the fort. The one over the exterior gate having been described by Captain Burton was omitted. Through the kindness of Captain Grayan, the Hon'ble Feley Verekar of H. M. S. "Nassau," I am now enabled to enclose for your consideration copies of the other inscriptions extant which I believe have never been transcribed before. One of these numbered I, is let into the wall over the interior gate and is in pitch darkness. It would have escaped notice altogether, had it not been pointed out by the Arab Jemadar of the Fort who furnished a lantern and a ladder for its perusal."

\* Three Voyages of Vasco da Gama, the Hakluyt Society's publication, pp. 141 and 142.

2. From the Under-Secretary to the Government of India, Foreign Department, forwarding copies of a translation furnished by Lieut.-Col. S. B. Miles, Political Agent, Maskat, of extracts from an Arabic work relating to Aden as follow :

EXTRACTS FROM AN ARABIC WORK RELATING TO ADEN.

The following notes giving a glimpse at the state of Aden six centuries ago are taken from the Itinerary of Ibn El Mojawir called the *Tarikh-el-Mostabsir* and have been selected, not as being by any means the most interesting portion of the book, but as relating to a part of Arabia to which more than usual interest attaches as being a British possession. The author does not give a connected account of current events at Aden, but he offers some information respecting the internal condition of the place and the fiscal arrangements of the Government, which is not altogether without interest. Ibn El Mojawir was not a native of Aden, but kept a journal, and noted down what he saw and heard in the towns and countries he visited; he is quoted by El Khuzraji, the historian of Yemen, as an authority for the period at which he wrote. The text of the manuscript is very corrupt and full of *lacunæ*, which may account for some of the deficiencies of translation.\*

(Sd.) S. B. MILES, *Lieut.-Col.*

*H. B. M.'s Poltl. Agent and Consul, Muscat.*

*On the state of Aden in former times.*

From the Red Sea to Aden and beyond Jebel Sokotera was one united expanse of land; there was no sea in it and no gulf. Then came Dhul-Karnein in his tour of conquest and arrived at that place, and Abú Jafar having opened the gulf towards the ocean, the sea flowed into it until it stopped at Bab-el-Mandeb, and Aden remained in the sea which surrounded it. After that nothing was visible from Aden except the summits of mountains like islands, and we have proofs of that. Firstly, it is known that the marks which the sea and the waves have left remain visible on the summits of Jebel el Kar and on the mountain on which is the fort of Ta'kar and on Jebel Akhdar. And the second proof is that Shedad bin 'Ad did not build Irem Dhát 'Imád except between Lahej and the gulf on one side, and Mawya, which is on the road to Mafalis, on the other, and that side which is toward Jebel Darrina is desert. He did not build it except in the most odoriferous lands and breezes and airs in a delicious country far from the sea. At the present time the sea has returned to the neighbourhood of Irem Dhát 'Imád and swallowed up part of it, and the sea would

\* In the absence of the Arabic text the spelling of the names of persons and places has been left, with a few exceptions, as given in Col. Miles' original translation. Ed.



not be there had it not been for the opening made by Dhul Karnein, by which it expanded itself from the island of Sokotera and flowed until it stopped at the extremity of El Mandeb. The third proof is that the sea, which is between Sarin and its limit, is called Mutarid El Kheil and Murabit El Kheil, and it was there that the Arabs originally used to tether their horses in that country. It is certain also they used to exercise their horses there when it was dry land. When Dhul Karnein opened Bab-el Mandeb all the country was flooded, and no signs of it were left except some islands that were formed in the sea, and it is called by its original name Mutarid El Kheil. From what is stated by the Amír Abú Tainí Jefash bin Nejab in his book *El Mufeid fi Akhbar Zebid El Awal* (for there are two Mufeids, the first whose author is the Amir Jefash, and the second, composed by Fakhr-ul-din Abu Ali Amara bin Muhammad bin Amara), it appears that the sea had greatly diminished when the Abyssinians conquered the Arabian Peninsula. They took possession of Sanaa at the border of the country of the 'Awahil, and their dynasty remained there both in pre-Islamite and Muhammadan times until Ali bin Mehdi destroyed them in the year 554 A. H., when their power disappeared and their rule declined with extreme rapidity. To return to the account of Dhul Karnein. The sea remained in that state until Dhul Karnein opened Bab-el Mandeb, and the sea flowed into it and reached the end of Kulzum, when it spread out and extended until it laid bare the land of Aden. The account that Abu Abdulla Muhammad ibn Abdulla Al Keysani gives in his commentary is, that when Shedad bin Ad set out from Yemen to visit the dependencies of Hadhramaut, and had passed the borders of Lahej, he saw Jebel Izz and conjectured from its size that it was very distant; he therefore sent his retainers to explore this mountain and see what was below it. When they had examined the place, they returned and said it was a valley in which were trees and huge serpents, and that it overlooked the salt sea. When he heard this account Shedad descended to Lahej and ordered his people to dig wells, and from these the people of Aden still continue to draw water. He also ordered they should excavate for him an entrance in the side of the valley.

*Excavation of the Entrance and Aqueduct.*

The excavation of the gate and aqueduct was performed by two men, and the wise men of Hind say they were Efrits of the Jinn. One of them commenced excavating the rock, while the other began to dig the trench at Ras Socotra, in the dependency of Lahej, and the two did not cease from their exertions in excavating and tunnelling until but little was left of the work. Then said the excavator—"If it be the will of God the Almighty, to-morrow I shall be free and have finished my work." And the digger of the trench said, "and I to-morrow will cause the water to enter

Aden whether it please God or no!" Then it came to pass that the aqueduct became broken in various places and the spring of water was checked at its source, and what had been built up fell down, and no part of it was completed, nor was any benefit derivable from it. The trench had been brought to the foot of Jebel Hadid, when it was brought to nought \* \* \* \* \*. But when the morning of the morrow came to the excavator the tunnel was finished, and the gate was opened, and the work was accomplished as he desired. It is said he was engaged in the excavation for a period of seventy years until it was completed. After a long space of time Shedad bin Ad used to throw into that place those who deserved imprisonment, and it remained a prison until the end of the dynasty that was at that time over Egypt, and after the decline of that dynasty the place became ruined.

#### *Cities used as Prisons.*

Siraf was the prison of Sultan Mahmoud bin Muhammad bin Sam, and Aden was a prison of the Pharaohs, but it ceased to be a prison under the Fatimites. The Indians say Aden was the prison of Das Sir, the name of a Jinn with ten heads, one of which was that of the deer Dilaeser, and he used to dwell on Jebel Mundhir, and to disport himself on the sands of Hokat Bay, and after that Hokat was inhabited by Indians, and no one was expelled therefrom except Suliman, son of Daud, on whom be peace, when he arrived at the land of Yemen to visit Bilkis, and this was by reason of the people before described being Efrits. Aden was so called, because he who founded it called it after his son Aden. Some say, however, that it derived the name of Aden from the tribe of Ad. It is also said that the first man who was imprisoned in it was named Aden, and it was called after him. And Ibn Mojawir says it derived the name of Aden from Ma'aden, because it was formerly an iron mine, and it was called by the Persians Akhirsikin, and by the Indians Siran. The merchants call it Tákal Saida, and it is also known as "Pharaoh's prison," "the abode of Jinns," and "the shore of the sea." By the Indians it is named Hatám, and by gentle folks it is considered a filthy place, because whatever people throw out there the wind drives back upon them; and it is styled by some the Custom House of Yemen. The house called by the common people *the House of Good Fortune* is the house built by Seif-ul-Islam Taghtagin opposite the Custom House, and they call *the Long House* the house built by Ibn Halem facing the Custom House. The house named Mundhir is the house built by Malik El Maiz Ismail bin Taghtagin upon Jebel Hokat, and it is called by merchants Sira and Hira. Jebel Sira is a lofty rock in the sea confronting Aden and Jebel Mundhir, of which it is said to be a portion. Muhammad bin Abdulla El Keysani says in his commentary that on the day of Judgment fire will be emitted from the Sira of Aden and

drive the people to hell, and the proof of that is, that in the heart of the rock is a well named Amber, and the sages of Hind call it Bir Yeran, and smoke issues from it perpetually. It is now called Bir Heramasat, and no one is able to look at it on account of its terribleness and its gloom and vapour. Round about the well are found broken stones and snakes sleeping and animals standing, and the Indians say that Hunwit, the before mentioned Efrit, dug this well, which indeed is not a well, but a subterranean passage excavated under the sea to the city of Ujain Bikrami, which is the capital of the King of Malwa in India. It was stated to me by Mubarak El Sharoni Maula, father of Muhammad bin Mesud, saying the cause of the excavation of the well Yeran was Hadather, and this Efrit stole the couch of the wife of Ram Haidar from the province of Oudh and flew with her until he rested on the summit of Jebel Sira. He then said to her:—I desire to change your form from that of a human being to that of a Jinn, and they began to wrangle, and Hunwit, who was an Efrit in the form of an ape, hearing them quarrel dug this passage from the city of Ujain Bikrami under the sea until it terminated in the centre of Jebel Sira, and he completed it all in one night. Issuing from the passage he found her (Haidar's wife) sleeping under a thorn tree on the top of the hill, so he took her on his back and descended with her into the passage, and ceased not to proceed with her until he arrived at Ujain Bikrami about daybreak, when he delivered her to her husband, Ram Haidar, who became blessed with two male children by her, one of whom was named Luth and the other Kus, and her's is a long story and requires a lengthy narration, but the passage exists to this day. To return to the former subject. When ships are retarded by the monsoon in their endeavours to reach the mouth of Aden harbour, they bring to Jebel Sira seven oxen about the time of sunset, and leave them in some place until the middle of the night. Towards the end of the night they send back six to Aden leaving but one ox there, which they sacrifice in the morning, and they call that sacrifice "the sacrifice of the hill." When they have done this the ships are able to approach and arrive one after the other. This custom was instituted in ancient times during the sway of the Beni Zuri and other Arab dynasties, but the practice has ceased in our time.

*Note.*—When a ship on a voyage weathers Sokotera or Jebel Kudmul, they call that weathering "El Foulah," and they take a dish and put in it a sail and rudder and other appurtenances of a ship, and place therein some morsels of cocoanut, salt, and pomegranate and float it on the sea in the raging waves, and then say that it draws near and arrives in safety to the foot of the hill.

#### *The Building of Aden.*

With the fall of the Empire of the Pharaohs, Aden became ruined

and deserted, and the peninsula was inhabited only by fishermen who pursued their occupation there. These remained a long time provided by God's bounty, until the men of Kamar came in their ships in great numbers and took possession of the peninsula after they had expelled the fishermen by force, and they dwelt on the summits of Jebel Ahmar and Kokat and Jebel Munzhir which overlook the farms, and their signs and works are extant to this day in stone and mortar filling the valleys and hills. The poet says—

As for me I weep copiously ; for their houses have become empty.

And the leader of their camels has departed.

The anguish of separation makes me mad.

I stand on their habitations raving about them and asking :—

O houses ! have you news of them ?

Return me an answer quickly.

It was answered me from their houses wailing and crying :—

Weep blood, O neglectful one !

The caravans have departed.

My slave girl is with them : in elegance and qualities perfect ;

In face and form roselike and thornlike.

They used to start from El Kamar reaching Aden in one voyage and in one season. Ibn El Mojawir says that that race of people has died out, and their dynasty become extinct and their career terminated, and no one is to be found in our time who knows the history of them or can relate their condition and actions. Ibn El Mojawir says :—From Aden to Makdasho is one season (or journey), and from Makdasho to Kilwa another season's voyage, and from Kilwa to Kamar a third season ; but that tribe used to perform the three seasons' journey in one season, for one ship actually performed the voyage from Kamar to Aden in this way in the year 626 A. H. ; starting from El Kamar and bound for Kilwa it anchored at Aden. Their vessels had outriggers on account of the straitness of the seas and danger of the currents, and shallowness of the water there. When the tribe became enfeebled the Berbers overpowered them and expelled them thence, and possessed the land and inhabited the valley, the space now occupied by mat huts, and they were the first who erected mat huts in Aden. After them the place became ruined, and so remained until the men of Siraf invaded it, and mention has already been made of them before. And Sultan Shah bin Jemshid proceeded to Aden, and having disembarked established himself there, and the place became re-peopled thereby. It was his intention to have brought drinking water by aqueduct for the people from Zeila,\* but the distance proved too great, so he built tanks to collect the rain water, and the clay used for building them was brought from the

\* Zeila is a hamlet about forty miles north of Aden, where there is a perennial stream.

neighbourhood of Abien, or, as some say, from Zeila. When the population of Aden had much increased, several baths were erected, one bath being built near the Habs El Dam. In the year 622 A. H. a heavy torrent descended and swept clean the whole town. The Jama mosque was constructed near the bath of Motamid Razi-ul-Din Ali bin Muhammad El Tukriti, and this Prince built stables for his elephants in the year 625 A. H. And the population filled the space at the foot of Jabel Akhdar in its whole length and breadth, and when he perceived that he assumed the Sultanate.

*Titles and Names of the Kings of Ajam who ruled over the country of Aden.*

1. Sultan Shah bin Jemshid bin Asaad ibn Kaisar.
2. Abu Sinan Siawash bin Asaad bin Kaisar Kasim Amir El Mominin.
3. Abu El Muzuffar Asaad bin Kaisar Burkan Amir El Mominin.
4. Abu Shajaa Namshad bin Asaad bin Kaisar Nasra Amir El Mominin.
5. Abu El Fatah Keikobad bin Muhammad bin Kaisar Moiz Amir El Mominin.
6. Abu Said Kaisar bin Rustam bin Kaisar Umdat Amir El Mominin.
7. Abu Samsan Ad bin Shedad bin Jemshed bin Asaad ibn Kaisar Yemin Amir El Mominin.
8. Abu El Mulk Taj-ul-din Jemshed bin Asaad bin Kaisar Zabir Amir El Mominin.
9. Abu El Wafa Kudar Shah bin Hezeraat Yemin Amir El Mominin.
10. Abu El Burkat El Harith Hazaraad bin Jemshed bin Asaad Husain Amir El Mominin.

These were the Persian Kings who ruled in Aden.

*Building of the Walls of Aden.*

It was related to me by Abdulla bin Muhammad bin Yehia that a ship from the west once anchored at Aden at night, and the Captain having landed was walking around Aden, when he came to a lofty house in which were lighted candles and perfumes burning, so he knocked at the door and a slave descended and opened to him saying, 'Do you require aught?' The Captain replied, Yes; so the slave asked permission for him, and the master of the house said, 'Let him come', so he ascended, and they saluted each other, being unacquainted, and they began to converse, and the Captain said, 'I have arrived this night from the west, and I desire of the master's kindness that he will conceal for me some valuables'. He said, 'Why?' The Captain

replied, 'I am in fear of the Dai'. Then the master of the house said, 'I consent, have no fear of oppressors, transport all you have to a certain house'. So the Captain descended, and the merchants began to land their property from the ship in boxes and transport them to the house until they had lightened the ship of two-thirds of the cargo. When the morning came the Captain found his host of the night before to be the Dai himself, and he said to himself, "I sought shelter from the rain and sat down beneath the spout;" and he was troubled in mind, and his face became clouded. Then the Dai sent for him and said to him, 'I am your friend of last night, and I am the Dai, the Governor of Aden at this time; be comforted and set your mind at ease; the customs duties on your ship are a present from me to thee with the house in which you have alighted, and these 1,000 dinars are for your expenses while you remain in our city. God forbid I should take anything from you either in the way of present or of trade'. The Captain then said, 'Wherefore is all this done to me?' The Dai said, 'On account of your entering upon me in my house at midnight'. Then he gave orders that the wall should be extended from Hisn Akhdar to Jebel Hokat, but they constructed a very weak wall, and it fell down bodily and was destroyed by the unceasing action of the waves on it, and when it was ruined he built on it another wall of interlaced canes, and this remains to the present day. Abu Othman Omar bin Othman ibn Ali El Zangibili El Tukriti built a wall running along the height of Munzhir to the end of Jebel El Izz, and erected on it the Hokat gate; and he built a second wall on Jebel Akhdar, the extent of which was from Hisn Akhdar to El Takhar on the ridge of the hill. He also constructed a wall on the shore from El Tabagha to Jebel Hokat, in which were six gates, *viz.*, the Sabagha and Juma gates; the Sikka gate, which has two entrances or arches through which the torrent rushes when it rains at Aden; the Furza or customs gate for the merchandize to pass in and out; Bab Musharif or Musharij gate, which is continually open for the passage of people; and Bab Habak, that is always closed; there also the gate to the interior that has been mentioned before. The walls were built of stone and mortar, and he also constructed the Custom House, placing in it two gates. Ibn Zangibili besides constructed the old Kaisarea or covered bazars, and the markets or shops, and houses of stone, and Aden returned to its former state (of prosperity); but when Saif El Islam entered Aden, Ibn Zanjibili devoted all his property for religious purposes at Mekka in the year 575 A. H. El Malik El Maiz Taghtagin ibn Eiyub built a block of houses, the whole of which were shops at the gate, and he gave over the new Kaisarea to the druggists. Then Motamid Razi-ul-din Muhammad bin Ali El Tukriti erected buildings in the name of Malik El Mesaud Eusuf bin Muhammad bin Ali Bekr, and the population increased in it; and they built houses and

amassed property, and many Arabs from all parts came and settled there. Afterwards Motamid Muhammad bin Ali built a beautiful bath, and the people dug wells and erected mosques with pulpits, and its splendour returned, and it is certain that it arose after the port of Abien had become ruined. And the merchants removed from the city of Abien and dwelt at Kalhat and Magdisho, and the three cities grew up at that time, but God knows.

#### *Description of Aden.*

The town is in a valley surrounded by the sea; its climate is so bad that it turns wine into vinegar in the space of ten days. The water is derived from wells, and is also brought in by an aqueduct two fursakhs long. The sweet water wells in Aden are—Bir Hulkum and El Sultaniya, Bir Ali bin Abi Burkat ibn El Katib, very old; Bir Ahmed bin El Musib; Bir ibn Abi Gharat, very old, it is near the gate of Aden; Bir Mukaddum, also very old; three wells belonging to Daud bin Muzmun, the Jew, and three wells belonging to Sheikh Omar bin Hossein, a well of Ali bin Hossein El Azruk; Bir Jaafir, very ancient and forty cubits deep; Bir Zafran known by its trough, and which is set apart for Moslems. I was informed by Abdulla bin Muhammad bin Yehia that the water of the Zafran well was carried to all the towns of Yemen, because, he said, Seif-ul-Dowla Ababak Soukar, a slave of Malik El Maiz Ismail bin Taghtageni, drank at the house of Mutamid Muhammad bin Ali El Tukriti some wine of very agreeable flavour, and he said to him—"Of what is this wine made?" Mutamid replied, "Of water from the Zafran well. If I steep Kadhy in this water and leave it in the sun, it becomes wine (Nebid), and it requires neither honey nor anything else being put in." From that time they were used to transport this water to Jend, Taiz, Sanaa, and Zebid to make wine with it. The water certainly is now earthy, though they say it was originally as (sweet) as the Euphrates, but that it has now become somewhat salt on account of the evil deeds of the people. I was informed by Muhammad bin Zankal bin Hassan El Kirmani that an inhabitant of Aden asserted he had been told by Abdulla bin Muhammad Ishaaki El Dai that there were 180 sweet water wells in Aden, and that the water never decreased, but God knows.

#### *Account of the arrival of Ships.*

When a ship arrives near Aden, and the watchmen on the hill perceive it, they shout with a loud voice "Hirya." These watchmen are stationed at the end of Jebel Akhdar, upon which is built the fort El Akhdar, originally called Sirsiat. The watchman is unable to distinguish clearly except at the rising and setting of the sun, because at those times the rays of the sun glance on the surface of the water and distant objects appear. He fixes

a stick upright before him, and when he fancies he sees anything, on the sea he marks it off on the stick, and if it is a bird or other such thing it moves to the right or left, or rises up or descends, and then he knows it is not a ship; but if the object remain steadfast in a line with the notch on the stick, he knows for certain that it is a ship, and he signals to his companion who shouts "*Hirya*," and signals to the next watchman, who hails the hulk "O slave in the ship." Then the hulk sends news of the arrival to the Governor of the town, and the messenger after leaving the presence of the Governor, informs the officers at the Custom House, and after doing this he shouts with a loud voice from the top of the hill "*Hirya, Hirya, Hirya*." And when the inhabitants hear the shouts, they ascend the hills and mount the roofs of their houses and gaze to the right and left. If the watchman's signal turn out correct, they give him for each ship one *dinar mulki* and the same amount from the customs; but if he gave a false notice, he gets ten stripes. When the ship draws near, the bearers of good tidings go in boats to meet the ships, and as they approach, they salute the *Nakhoda* and ask him whence he has come, and the *Nakhoda* asks them about the country and who the Governor is, and the state of the market; and every one in the ship who has relatives or friends in the country asks concerning them, and receives good news or condolences as the case may be. Then they place something before him and write the name of the *Nakhoda* and the names of the merchants. The clerk also notes down everything in the ship of the goods and cloths, and gives them the paper, and the bearers of good news get into their boat to return to their shore. All of them then go in a body to the Governor and give him the clerk's manifest, in which are written the names of the merchants, &c., and they give an account of the ship, whence it has come, and what merchandize it has brought. When they leave the Governor they go about the town acquainting those whose friends have arrived of their near meeting, and they receive the reward of good news from each. When the vessel arrives in harbour and anchors, the *Naiib* of the Sultan comes on board, and the examiner also, and he searches man after man, examining even their turbans, hair, sleeves, trousers, and under their armpits; and in the same way a matron searches the women. When the merchants land the next day, they bring their personal baggage, and after three days they land their cloth and merchandize at the Custom House, where they open every package and count piece by piece; and if the merchandize is saleable by weight, they weigh it in a steel-yard, and the Sheik assesses all the articles very heavily indeed until nothing is left; the merchants swearing by God Almighty that they have acted straightforwardly before the Sheiks. Ibn Mojawir says at such times despondency comes over the merchant, and grief kills him, and he remains in the valley of death at having been treated in such a way as to lose both blessedness and salvation.



*Account of Customs Duties.*

Truly the duties were introduced in the days of the Beni Zurria, and they say that the first who invented them was a certain Jew named Khalaj El Mahawendi, whose rules were conformed to until his death. On the *bahar* of pepper a duty of 8 dinars was taken, besides a *showabi* or convoy tax of 1 dinar, and 2 dinars on its leaving the Custom House; on a package of indigo, 4 dinars *showabi* tax, and on its leaving the Custom House a quarter dinar; on a *bahar* of assafoetida 8 dinars, and on a *bahar* of cherry bark  $3\frac{1}{2}$  dinars; on a *bahar* of *tabashir* they levied  $20\frac{1}{2}$  dinars, and 1 dinar *showabi*; on *Ud el-dafu* (aloes wood) half the value was taken; and on a *frasila* of camphor  $25\frac{1}{2}$  dinars; on a *bahar* of cardamoms 7 dinars; on a *frasila* of cloves 10 dinars and *showabi* 1 dinar, and from a *frasila* of 10 maunds they take 20 lbs.; on a *frasila* of saffron  $3\frac{1}{2}$  dinars; on a *bahar* of flax  $7\frac{1}{2}$  dinars, and when a ship is sold the vendor pays a fee of 10 per cent.; on iron they take half the value, a tax introduced in the days of the Dowla Saif El Islam Taghtagin bin Eiyub, who first took it from Abi El Hussun El Baghdadi, or, as some say, from a certain Kirawani in the year 598; on house owners a fourth part and some say a third and 2 dinars for notification; on a *bahar* of madder 12 dinars, introduced in the days of the Dowla Malik El Maiz Ismail bin Taghtagin, before whose time the duty was 2 dinars, or as some say 3; and on a *bahar* of tamarinds 3 *joz*; and on ten *Mokalib* or chemises  $2\frac{1}{2}$  dinars; on 10 goats three-quarter of a *jaiz*; on each sheep a quarter; and on each horse when it enters the town 50 dinars, introduced in the reign of Malik Nasir Eiyub bin Taghtagin bin Eiyub; on each horse when exported by sea they take 70 dinars; and on each slave 2 dinars, and when one is taken out through the gate half a dinar; on slave children from Sindapur 8 dinars and 1 dinar *showabi*; and they take on these children when passed out half a dinar each, which goes to the liquor contractor; on a piece of silk of Zebid manufacture half a dinar and 1 *jaiz*; on white cloth one-eighth; on dark coloured clothes 3 carats; on plaid waistcloths a quarter and 1 *jaiz*, and per score of coverlets (or cloaks) four dinars; per score of handwoven fabrics  $2\frac{1}{2}$  dinars, and the same on scarves; per score of unbleached Indian cloths  $2\frac{1}{2}$  dinars; on large striped linens 2 *joz* and 2 carats, and on small ditto 2 *jaiz* and 2 *fulús*; on every bag of millet one-eighth, and God knows and orders.

*Account of the introduction of the Showabi Tax.*

The Kings of the Beni Zurria were unacquainted with vessels of war, and remained so until the arrival in Yemen of Shums-ul-dowla Turan Shah bin Eiyub, who brought with him some war vessels. After him Othman bin Ali El Zanzibili El Tukriti became ruler of Aden, and the war vessels remained with him until he fled and Seif El Islam Taghtagin bin Eiyub

entered Yemen, and one of the most sagacious of the inhabitants counselled him saying—How do you consider it lawful to take customs from merchants? He replied, I do as the Kings of the Beni Eiyub did in following an old custom. The man said they used to take it from the people by force, but do thou take it in such a way that you may obtain the thanks of the people. Seif El Islam replied, And how can I do that? His adviser said, Send these war vessels to sea that they may protect the merchants from pirates, and so have honourable employment instead of lying uselessly rolling in the sun. He said, By God, you have come with good advice, and he despatched the vessels to India, where they were stationed off Ras Manadilh to protect the merchantmen from the attacks of corsairs, and they remained thus until the year 613 A. H. After that there came to him some of the chief men, and said, God perpetuate the reign of Our Lord the Sultan, in that His Highness' treasury expends every year, on the war vessels 50,000 or 60,000 dinars without any return; but if His Highness were to take this amount from the merchants, it would be no loss to them. He said, How is that? They replied, On every 1,000 dinars of customs let there be taken also 100 dinars for the war vessels which will be for His Highness, and it will not burthen the merchants much. And this plan was adopted in the days of the Dowla El Mesud Eusof bin Muhammad ibn Ali Bekr bin Eiyub, and it remained so until the year 625 A. H. \* \*

*Articles that are not taxed.*

Articles imported from Egypt, such as wheat, flour, sugar, rice, soap, *el raki*, hyssop, perfumery, olive oil, oil of *el jar*, pickled olives, and everything connected with its transport, nuts for sweetmeats, if in small quantities, and honey in small quantities, and whatever is brought from India for re-exportation by sea, and pickled *emblie*, myrobalans, cushions, pillows, bracelets, leather tablecloths, rice, *kichri*, which is rice and pulse mixed, *simsim*, soap, red ochre, poisons, *karanful* wood, *garabi* cloth which is manufactured in Malabar, the productions of Shehr, *maklay*, which are split dates with the stones extracted, and salt fish: these, however, are chargeable with duty if they have the heads on, but not otherwise, and Indian sandals, on which, however, duty is charged if furnished with straps, but not otherwise, sheep and goats also are not taxed, and beautiful slave girls brought from Dabul and large-eyed slave boys brought from India are not charged.

*Innovations at Aden.*

When it was the month of Jemadi el Awal in the year 624, or more correctly 625, a Dar El Wakalat was established in Aden, and on all merchandize on which no customs were taken they imposed a tax. At the

present time they levy five taxes altogether, *viz.*, the old tax which is the customs, the *showabi* tax, the Dar El Wakalat tax of one carat in the dinar, the Dar El Zakat, and brokerage. The Nakhoda Othman bin Omar El Amdî arrived once from Egypt and was found to have with him two maunds of aloes wood which they took from him, and when the time came to settle accounts the maund of aloes was valued at 6 dinars, so  $1\frac{1}{2}$  dinars were charged for the customs and half a dinar for the *showabi* tax. It was then valued in the Wakalat at 25 dinars, and it was charged 8 dinars and 2 *daniks* for Wakalat,  $1\frac{1}{2}$  dinars for Zakat, and half a dinar for brokerage, which altogether came to 15 dinars, so after deducting the price of the aloes six dinars there remained a balance against him of 9 dinars. The Nakhoda Othman bin Omar El Amdî protested, and said, "By God Almighty, I gain nothing by it, not a single *fuls*; is it not enough that you take from me the two maunds of wood for nothing, but you must demand of me 9 dinars besides!" And the Amir Nasir-ul-din Nasir bin Farât and his followers came upon them at that time, and he said—"This man is constantly coming to Aden and should we take from him double!" and he mediated between them until he squared the account. \* \* It is said that a ship once arrived on which the customs duties came to 80,000 dinars. There used to anchor every year under Jebel Sira 70 or 80 ships or more perhaps, but not less. And they despatched from Aden every year four treasure parties to the fort of Taiz, *viz.*, the receipts on the ship arrivals from India, the receipts from tribes entering Aden, the export duty on horses to India and the receipts from ships journeying to India. Each of these treasure remittances amounted to 150,000 dinars, or more, but not less, but this has ceased in our time, 625 A. H. The circulation of Aden in the time of the Beni Zurria was gold of Sanaa on the Sultani standard, but less than it and the currency of the country was gold *Maliki*, whereof  $4\frac{1}{2}$  dinars, equalled one Egyptian dinar. The *dinar* was divided into quarters, each quarter being equal to three *joz*, each *jaiz* to eight *fulûs*, and each *fuls* to two *beidhas*, and it is said the first who struck the *Maliki* dinar was Ahmed bin Ali El Sulehi at Sanaa.

They sell *rusi* (a kind of cloth) by the *Kasba*, the length of which is four cubits of iron, and they sell teak planks by the iron cubit, and everything was sold by auction to the highest bidder, and similarly slaves and slave girls.

Some disappointment was felt at Mr. Wood-Mason's announcement that the living specimen of *Rhinoceros Sondaicus*,\* which was to have been exhibited at the meeting, was indisposed, and could not attend; Mr. Mason,

\* The animal died on the following day. Its skin will be exhibited at the next meeting.—(J. W.-M.)

however, exhibited some excellent photographs of the animal in question, and of *R. Indicus*, and pointed out the differences in the structure of the epidermal exoskeleton in the two species.

Mr. Wood-Mason exhibited the materials for his monograph of *Paratelphusa*, an Indo-Malayan genus of freshwater crabs, of which he recognized altogether seven perfectly distinct and well-marked species; of these five had been or are now described by himself. The genus, he said, was established in 1855 by M. Milne-Edwards for the reception of two new species of crabs, one of which was supposed to have come from the China Seas, the other from New Zealand; but the localities given had proved to be incorrect, the former being really a native of the freshwaters of Southern China and Siam, the latter of those of the three great Sunda Islands—Java, Sumatra, and Borneo. Mr. Wood-Mason, in 1871, himself described two additional species, the one from upper Burmah, the other from India, wherein it ranged from Hardwár, the point at which the Ganges issues from the Siwálik Hills, throughout the Gangetic valley down to Calcutta, where brackish water conditions obtained, and where it occurred both in fresh and brackish water like several of its congeners. It was an interesting fact that all the species described by him inhabited countries the fauna of which was largely leavened, to say the least, with Malay forms, if indeed such forms did not predominate. We were indebted to Mr. W. T. Blanford, than whom nobody had ever done more for the distribution of animals in India, for dividing up the vast tract of country commonly called India into a number of zoological sub-provinces, to one of which, *viz.*, to that denominated by him the Eastern Bengal Province, with the Burmese countries and Assam added, the *Paratelphusas* were confined: Calcutta, Mr. Blanford had said, was on the edge of this province and rather in than outside of it; and Calcutta accordingly had its species of the genus in its common tank-crab. If we turned from these invertebrates to seek an instance amongst the higher animals of this Malayan leaven in the fauna, no more conspicuous one could possibly be found than the interesting animal represented in one of the beautiful photographs exhibited,—the *Rhinoceros Sondaicus*, which inhabited not only the Sunderbans near Calcutta but the great island of Java also. In conclusion, Mr. Wood-Mason said that he could not but look forward with much interest to see whether species of *Paratelphusa* would be found in Ceylon and in Malabar, the fauna of which curiously enough was also Malayan.

The following are the new species:

*Paratelphusa Martensi*. •

Latero-anterior margins of carapace armed with three epibranchial teeth, the first tooth flattened, similar to the extraorbital angle but smaller, the rest salient, acute, and conical. Post-abdomen of the male triangular—as in *P. Dayana*, W-M.

*Hab.*—Throughout the Gangetic valley, from Hardwár to Jessor.

*Paratelphusa Edwardsi.*

Latero-anterior margins of carapace with four teeth, the teeth all equal and similar to one another, large, almost conical, and very salient. Carapace considerably arcolated, longitudinally very convex, antero-lateral margins much inclined, post-frontal crest well-developed. Post-abdomen of the male as in the preceding.

*Hab.*—Cachar, Saddya, and the Gáro-, Nágá-, and Dafla-hills.

*Paratelphusa crenulifera.*

Latero-anterior margins of carapace with four teeth, the teeth tolerably well-developed and salient, flattened, diminishing gradually in size from before backwards. Carapace perfectly smooth, depressed, longitudinally but slightly convex, antero-lateral margins hardly inclined. Frontal and orbital margins conspicuously, the edges of the feebly-developed post-frontal crest and of the epibranchial teeth faintly crenulate. Post-abdomen of the male as in the preceding.

*Hab.*—Pegu Yomah.

Mr. Wood-Mason next exhibited a specimen of the beautiful macrurous crustacean long ago described and accurately figured by Herbst ('Krabben und Krebse', Band II, Heft 5, 1794, S. 173, T. XLIII, F. 2,) under the name of *Astacus modestus*. This remarkable crustacean, like the *Astacus zaleucus*, v. W-S. for which the new generic title *Thaumastocheles* had recently been proposed (P. A. S. B., 1874, p. 181), was an example of a transitional form connecting the two families, *Thalassinidae* and *Astacidae*: in *Thaumastocheles zaleucus* the facies of the former family was combined with characters that entered into the usual definition of the latter: *Eutrichocheles*, as he proposed generically to designate the species described by Herbst, on the other hand, was indubitably, as the totality of its organism showed, a member of the latter presenting certain structural arrangements which were unmistakable marks of real affinity to the former. The *Callinax adriatica* of Heller was just such another transitional form. In fact, it was now, in his opinion, impossible to frame such a definition of either family as would exclude all the members of the other owing to the number of the connecting links. The *Eutrichocheles modestus* was also especially interesting as being the nearest known blood-relation of the remarkable blind crayfish described two or three years ago under the name of *Nephropsis Stewarti*. In conclusion, Mr. Mason said that he had long been engaged in the comparative study of these and various other allied forms, and that he hoped shortly to be able to formulate the results at which he had arrived.

Mr. Wood-Mason also exhibited several new species of Stomatopod crustaceans, viz. *Clorida decorata*, with eyes as in *C. microphthalma* M.-Edw. and *C. Latreillei*, Ey. and Soul., the inner margin of the sabre-like

appendage, of the lateral portions of the caudal swimmeret armed with fine, acuminate spines, and the telson vermiculated above and below with granulated ridges, claw of raptorial arm 5-toothed—from the Andamans: *Coronis spinosa*, with three spines projecting from the telson just above the level of the marginal ones, of which there are three pairs, the median pair movable and smaller than the rest and with the interval between them finely serrated (5 or 6 teeth on each side of the middle line), between these and each lateral pair two spinules, between the teeth of each lateral pair one spinule; claw of raptorial arm 10-toothed—from the Andamans and New Zealand: *Gonodactylus glyptocercus*, allied to *G. trispinosus*, with the telson ornamented with two oval tubercles bounded by an impressed invected line and with a median basal cinquefoil-shaped one, and the two preceding somites symmetrically engraved with fine lines—from the Nicobars; and *Squilla supplex*, with three short oblique ridges on each side of the telson, between which and the strong median ridge, on each side, a row of confluent tubercles in the same straight line with the two median marginal teeth; five teeth to the claw of the raptorial arms; post-abdominal somites with 9 ridges, arranged 3 in the middle and 3 on each side—from Bombay.

The following papers were read:

1. On some Lizards from Sind, with descriptions of new Species of *Ptyodactylus*, *Stenodactylus*, and *Trapelus*.—By W. T. BLANFORD, F. R. S.

(Abstract.)

This paper contains notes on a collection of lizards made in Sind in the early months of 1875. Five species are added to the fauna of British India, two of which, *Stellio nuptus* and *Hemidactylus Persicus*, were previously known from Persia, whilst three appear to be new. These are described as:

*Ptyodactylus homolepis*, sp. nov.

Allied to *P. Hasselquisti*, but distinguished by having all the dorsal scales uniformly granular, without any enlarged tubercles, and the nostrils entirely surrounded by swollen shields 3 or 4 in number which separate them entirely from the rostral and labials. A perfect specimen measures  $7\frac{1}{2}$  inches, of which the tail is  $3\frac{1}{4}$ . Found in the lower hills of the Khirthar range, west of Upper Sind.

*Stenodactylus orientalis*, sp. nov.

General form stout, tail much thicker than in *S. guttatus*, finely granular throughout; nostril between the corner of the rostral and three small shields, upper labials on each side about 10, lower 10—13, both becoming small behind: pupil vertical. No enlarged chin-shields behind the lower labials. Upper surface finely granular, with small convex dark coloured tubercles scattered over the back; none on the limbs. Scales of abdomen scarcely

larger than those of the back. Toes short, thick, finely fringed on both sides, lower surface with cross plates, each divided into raised ribs or tubercles: all the toes with claws. Colour pale sandy, dotted over with the dark brown enlarged tubercles, dark transverse bands on the tail. The largest specimen obtained measures 3·3 inches, of which the tail from the anus is 1·4. One specimen obtained in the hills west of Mehar, another on sand-hills south of Rohri.

*Trapelus rubrigularis*, sp. nov.

General form similar to that of *T. ruderatus*. Head short, depressed. Both eyelids fringed with elongate pointed scales. Ear-opening larger than a nasal shield, without any fringe of long pointed scales partly covering the orifice, tympanum very little sunken. Scales of the back smooth or very faintly keeled, subimbricate, arranged in oblique rows, with larger bluntly keeled scales, each about equal to four ordinary scales, scattered irregularly over the back and basal portion of the tail, but not on the limbs. Tail-scales keeled. Scales of abdomen smooth. Claws moderate, those on the fore feet scarcely exceeding those of the hind feet in length and none of them half the length of the thumb without its claw. A single row of 10 to 12 pores just in front of the anus in males. Colour olive brown to grey, spotted with pale yellow, each enlarged scale of the back being in the middle of a pale spot. A dusky longitudinal line on each side of the neck and 3 or 4 pairs of dark spots on the back. A bright red patch beneath the throat in living specimens of both sexes; this colour disappears after a time in spirit. The largest specimen obtained was nearly 7 inches long, tail 3·8. Found in the semi-desert plain extending along the foot of the Khirthar range in Upper Sind.

The paper will be published with illustration in Part II of the Journal for 1876.

2. *Note on a large Hare inhabiting high elevations in Western Tibet.*

By W. T. BLANFORD, F. R. S.

(Abstract.)

The hare previously identified, with doubt, as *L. pallipes* proves, on comparison with specimens of the latter received from Mr. Mandelli at Darjeeling, to be distinct and is described as new under the name of *Lepus hypsibius*, from its inhabiting very elevated regions. The description is taken from a specimen collected by Dr. Stoliczka at an elevation of 15,500 feet in the Changechenmo valley, Ladak.

*S. hypsibius*, sp. nov.

Ears but little longer than the head, with only the extreme tips black, brown outside in front, whitish behind, buff inside, anterior dark band

ill-marked. General colour rufous brown, rump dusky ash, tail and lower parts white. Fur long, dense, and slightly curly, woolly near the base. Length of a skin from nose to rump 24 inches, tarsus, which is clad with very thick hair, 5. Ears from the head 4·5, skull 3·6.

The description will be published in full in No. 4, Part II. of the Journal for 1875.

3. *Note on the presence of a loreal pit in Elachistodon Westermanni, on Platyceps semifasciatus, Ablepharus pusillus, and Blepharosteres agilis.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

A snake from Purneah with a loreal pit has been recognised as *Elachistodon*, a remarkable genus with gular teeth. *Platyceps semifasciatus* is identified with *Zamenis ventrimaculatus* and *Ablepharus pusillus* is recognised as distinct from *A. agilis* (*Blepharosteres agilis*, Stol).

This note will be published in Journal Part II, No. 4, 1875.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in November last.

#### *Presentations.*

\*\*\* Names of Donors in Capitals.

The Flora of British India. By J. D. Hooker, C. B., Vol. I.

Indian Wisdom, or Examples of the Religious, Philosophical, and Ethical Doctrines of the Hindus. By Monier Williams, M. A.

GOVERNMENT OF BENGAL, HOME DEPT.

Records of the Geological Survey of India, Vol. VIII, Pt. 4, 1875.

DEPT. OF REVENUE, AGRICULTURE AND COMMERCE.

Abstract of Results of a study of the Genera *Geomys* and *Thomomys*, by Dr. E. Cones, U. S. Army.

DEPT. OF THE INTERIOR, WASHINGTON.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Juni, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Oesterreichische Monatsschrift für den Orient. No. 10, October, 1875.

ORIENTAL MUSEUM OF VIENNA.

Bulletin de la Société de Géographie, Septembre, Octobre, 1875.

Octobre.—*L'Abbé Desgodins. Itinéraire de Yerkalo à Tso-Kow, (with map).*

GEOGRAPHICAL SOCIETY OF PARIS.

Annales de la Société Géologique de Belgique, Tome Premier, 1874.

GEOLOGICAL SOCIETY OF BELGIUM.



Bollettino della Società Adriatica di Scienze Naturali in Trieste, Nro 5, 1875.

Prof. A. Vierthaler.—La Collezione di oggetti d'esportazione in Rangoon.

ADRIATIC SOCIETY OF NATURAL SCIENCES, TRIESTE.

Memoire della Società degli Spettroscopisti Italiani. Nos. 1 to 9, Gennaio à Settembre, 1875.

No. 5. P. Tacchini. Account of the observations made at Camorta on the occasion of the Total Eclipse of April 6, 1875.

ITALIAN SPECTROSCOPIC SOCIETY, PALERMO.

Trudbi Imperatorskago Petersburgkago Botanischekago Soda, Tome III, P. II.

THE DIRECTOR OF THE IMPERIAL BOTANICAL GARDEN OF  
ST. PETERSBURG.

Professional Papers on Indian Engineering, edited by Major A. M. Lang, R. E., No. 18, Vol. IV, October, 1875.

Major C. A. Goodfellow.—Notes on the Position of the Neutral Axis in a Beam subjected to Transverse Strain. H. Leonard.—Weight on Foundations of Buildings in Bengal. H. Garbett.—Protective River Works at Dera Ismail Khan. Surgeon E. Nicholson.—Experiments on Cements at Bangalore. Form of Channel of Constant Mean Velocity.

EDITOR.

The Christian Spectator, Vol. V. Nos. 53 and 54.

EDITOR.

Descriptions of five new species of *Helicidæ* of the subgenus *Plectopylis*, with remarks on all the other known forms,—and

Supplementary Notes on the Species of *Helicidæ* of the subgenus *Plectopylis*. By Major H. H. Godwin-Austen.

AUTHOR.

Conspectus of the Sub-orders, Families, and Genera of *Chiroptera*, arranged according to their Natural Affinities. By G. E. Dobson, M. A.

AUTHOR.

#### Purchase.

The Academy, Nos. 177 to 182, September, October, 1875.

Poggendorf's Annalen der Physik und Chemie, Nos. 9 and 10, 1875.

No. 9. W. Weber.—Ueber die Bewegung der Elektrizität in Körpern von molecularer Constitution. A. Cornu.—Ueber die Diffraction, namentlich über Brennpunkte—Eigenschaften der Gitter.

No. 10. L. Bleekrode.—Experimentelle Untersuchung über Elektromaschinen mit Ebonitscheiben. H. W. Vogel.—Photographische Spectralbeobachtungen im rothen und indischen Meere. W. Siemens.—Ueber den Einfluss der Beleuchtung auf die Leistungsfähigkeit des Krystallinischen Selens.

A Tract on Sacrifice (Yajnasudhanidhi) by Rev. F. Kittel.

A short Survey on the Vedic Polytheism and Pantheism, by the Rev. F. Kittel.

Manual of Coorg, a Gazetteer of the Natural Features of the country and the Social and Political Condition of its Inhabitants, compiled by the Rev. G. Richter.

The Law of Partition and Succession, from the MS. Sanskrit Text of Varadarajas Vyavaharanirnaya, by Dr. A. C. Burnell.

The Revenue Compendium of the Madras Presidency, by T. Gopal Kristnah Pillay, 2 Vols.

Nagavarma's Canarese Prosody, by the Rev. F. Kittel.

A Malayálam and English Dictionary, by the Rev. H. Gundert.

A Grammar of the Tulu Language, by the Rev. J. Brigel.

Dayadacacloki. Ten Stanzas in Sanskrit containing a Summary of the Hindu Law of Inheritance and Partition, with an English Translation, by Dr. A. C. Burnell.

A Grammar of the Malayálam Language, by the Rev. H. Gundert.

#### *Exchange.*

The Geographical Magazine, Vol. II, No. X.

*Major H. Wood.*—The Attrek Bed of the Oxus. A Sketch of Mongolia and the country of the Tangutans. Extracts from letters from Mr. Ney Elias.

Nature, Vol. 12, Nos. 38 to 312.

The Indian Antiquary, Vol. IV, p. 48, November 1875.

*Major J. W. Watson.*—Sketch of the Káthis, especially those of the Tribe of Khá-char and House of Chotilá. *Prof. C. H. Tauney.*—Metrical Translation of Bhartrihari's Nīti Satakam. *J. F. Fleet.*—Sanskrit and old Canarese Inscriptions. *W. F. Sinclair.*—Rough Notes on Khándesh. *V. Ball.*—Nicobarese Hieroglyphics or Picture-Writing. *Capt. J. S. F. Mackenzie.*—Caste Insignia.

# I N D E X

TO

PROCEEDINGS, ASIATIC SOCIETY OF BENGAL,

FOR 1875.

	<i>Page</i>
Abul Gházi Sultán Husain Mirzá Bahádur, Coin of, ...	58
Abdul Hai, Maulavi, elected an Associate Member, ...	211
Abdul Latif, Khán Bahádur, Member of Philological Committee, ...	61
<i>Ablepharus pusillus</i> , ...	234
Accounts, Abstracts of, ...	xv—xxviii.
Address, President's, ...	36
Aden, extracts from an Arabic work relating to, ...	218
„ Landshells from, ...	138
<i>Aglaia paniculata</i> , ...	202
<i>Ailurus fulgens</i> , ...	98
Ajam, titles and names of the kings of, who ruled over the country of Aden, ...	223
Alá-uddín Abul Muzaffar Muhammad Sháh, of Dihlí, Coin of, ...	58
Algæ, Indian, ...	96
Alti Hills, Katak, Note on the, ...	63
Amír Husain Khán Bahádur, Election cancelled, ...	2
<i>Amoora dysoxylodes</i> , ...	202
„ <i>lactescens</i> , ...	ib.
<i>Amphibia</i> from Kashmír, Ladák, E. Turkistan and Wakhán, ...	201
Annual Report, ...	27
<i>Antelope bezoartica</i> , ...	120
„ <i>cervicapra</i> , ...	ib.
Antiquities of Orissa, ...	42
Apcar, (J. G., Mr.), Election of, ...	101
Archæology of Yunan, suggestions regarding, ...	2
<i>Arctomys aureus</i> , ...	186
„ <i>bobac</i> , ...	ib.
„ <i>caudatus</i> , ...	ib.
„ <i>hemachalanus</i> , ...	ib.
„ <i>Himalayanus</i> , ...	ib.

	<i>Page</i>
<i>Arcuella</i> , ...	185
Armstrong, (J. Dr.), Election of,	43
"    "    Member of Natural History Committee,	61
Asoka, Inscription of, from near Sasseram,	155
<i>Astacus modestus</i> , the type of a new genus of Macrurous Crustaceans,	231
" <i>zaleucus</i> , ...	<i>ib.</i>
Atkinson, (E. T. Mr.) Reading of an Inscription from Tilbegampúr,	15
"    (W. S. Mr.) Member of Library Committee,	60
"    "    resigns Trusteeship of Indian Museum,	109
Auditors, Messrs. Gay and Peterson, elected,	36
Aurangzib, Coin of,	138
Ayodhyá Máhátmya, translation of the,	138
Bactrian Coins, ...	58
<i>Bacula</i> , ...	185
Balabhi era, identity of with Gupta era,	45
Balban, Coin of,	138
Ball, (V. Mr.) exhibits specimens of Indian Boomerangs,	136
"    Member of Natural History Committee,	61
"    "    Physical Science Committee,	62
"    on some stone Implements of the Burmese type found in Pargana Dálbhúm, District of Singhbúm, Chutia-Nágpúr Division,	118
"    remarks on perforated stone implements from Kha- rakpur,	103
Banáras, Inscriptions from,	82
Bannerjea, (Rev. K. M.), Member of Natural History Committee,...	61
"    (Babu Satyadyal), Withdrawal of,	2
Bárah Bhúyahs of Bengal, No. II.,	141
Bárbak Sháh, Inscription of,	<i>ib.</i>
<i>Barbastellus Dargelinensis</i> , ...	85
Barelay, (G. W. Esq.), Member of Library Committee,	60
Bark, writing on,	66
Bate, (Rev. J. D.), elected an Associate Member,	211
Bayley, (The Hon. E. C.), elected Member of Council,	36
"    "    "    President,	35
"    "    on an inscription from the Chándah District,	62
"    "    on photographs of sculptures from Barahut,	44
"    "    remarks on a Copper-plate Inscription of the time of Skanda Gupta,	45
"    "    Resignation of Presidentship by,	82
"    (S. C. Mr.), Withdrawal of,	44

	<i>Page</i>
Beale, (T. W. Mr.), Inscriptions from A'grah, ...	115
"    on a Persian MS. entitled 'Imárát-ul-Akbar, ...	117
Beames, (J. Mr.), Member of Philological Committee, ...	61
"    Note on the Alti Hills, Katak, ...	63
Beavan, (Capt. R.), on an Inscribed Stone found in the Chándah	
"    District, C. P., ...	62
Bellew, (Dr. V. F.), Withdrawal of, ...	196
Benedict, (E. Mr.), Withdrawal of, ...	156
Bengal, Geography and History of, ...	141
"    Bárah Bhúyahs of, ...	ib.
Bhau Daji, (Dr.), Death of, ...	28
Bhurjapatra (Birch bark), used for writing on, ...	66
Bibliotheca Indica, Report on, ...	32
Bisset, (Lieut. W. S.), Withdrawal of, ...	2
Black, (T. W. Mr.), Election of, ...	127
Blanford, (H. F. Mr.), Member of Physical Science and Natural	
History Committees, ...	61
"    on some recent evidence of the Variation of	
the Sun's Heat, ...	120
Blanford, (W. T. Mr.), exhibits several Skins of <i>Mammalia</i> col-	
lected by Mr. Mandelli of Darjeeling, ...	197
"    "    exhibits specimens of Flint-cores and flakes	
from Sakhar and Rohri, on the Indus,	
Sind, ...	134
"    "    List of <i>Mammalia</i> collected by the late Dr.	
Stoliczka, when attached to the Embassy	
under Sir D. Forsyth, in Kashmir, Ladák,	
Kashgár, and Wakhán, with descriptions	
of new species, ...	186
"    "    List of <i>Reptilia</i> and <i>Amphibia</i> collected by	
the late Dr. Stoliczka in Kashmir,	
Ladák, Eastern Turkistán, and Wakhán,	
with descriptions of new species, ...	201
"    "    Member of the Physical Science, Natural His-	
tory and Library Committees, ...	157
"    "    Note on a large Hare inhabiting high ele-	
vations in Western Tibet, ...	233
"    "    Note on the Molluscan genera <i>Celostela</i> ,	
Benson, and <i>Francesia</i> , Paladilhe, and	
on some species of Land-shells from	
Aden, ...	138

	Page
Blanford, (W. T. Mr.), Note on the presence of a loreal pit in <i>Elachistodon Westermanni</i> ; on <i>Platyceps semifasciatus</i> , <i>Ablepharus pusillus</i> and <i>Blepharosteres agilis</i> , ...	234
"    "    on some Lizards from Sind, with descriptions of new species of <i>Ptyodactylus</i> , <i>Stenodactylus</i> , and <i>Trapelus</i> , ...	232
"    "    on the Species of Marmot inhabiting the Himalayas, Tibet; &c. ...	186
"    "    Scientific names of the Markhor and Sind Ibex, with a note on that of the Indian Antelope, ...	120
<i>Blepharosteres agilis</i> , ...	234
Bligh, (C. F. Mr.), Election cancelled, ...	2
Blochmann, (H. Mr.), Contributions to the History and Geography of Bengal, No. III., ...	141
"    "    exhibits Coins of A'zam Sháh from Northern Bihár, ...	112
"    "    Readings of Arabic and Persian Inscriptions from Dihli, ...	212
"    "    Readings of Muhammadan Inscriptions from Srinagar, Kashmír, Agrah, and Núrábád, near Dholpúr, ...	113
"    "    Translation of Inscriptions from Jaunpúr and Tilbegampúr, ...	14
Böhtlingk, (Dr. O.), elected an Honorary Member, ...	196
Bond, (A. Mr.), Death of, ...	28
Boomerangs, Indian, ...	136
Boro Boedoer, lithographs and photographs of, ...	196
Botanical Specimens, hints for the preservation of, ...	9
Botany of Yunan, suggestions regarding, ...	8
Bourne, (W. Mr.), Withdrawal of, ...	211
Brooks, (W. E. Mr.), Member of Natural History Committee, ...	61
"    on an apparently unnamed species of <i>Phasnicopterus</i> , ...	17
"    Postscript to description of <i>Phasnicopterus Andersoni</i> , ...	48
Brough, (W. S. Esq.), Member of Library Committee, ...	60
"    "    "    Physical Science Committee, ...	62
Buckle, (Dr. H. B.), Death of, ...	28
Buddhist Shrines, in District Bhágampur, ...	158
Burma, Land and Fresh-water Shells of, ...	140
Burmese Species of <i>Trionyx</i> , ...	170

	Page
Cable, telegraph, penetration of by grass, ...	123
<i>Calliaxis Adriatica</i> , ...	231
<i>Cælostele</i> , ...	138
<i>Capra bezoartica</i> , ...	120
„ <i>Falconeri</i> , ...	ib.
„ <i>megaceros</i> , ...	ib.
„ <i>ægagrus</i> , ...	ib.
Cappel, (A. Mr.), Member of Physical Science Committee, ...	62
Carrington, (R. E. Mr.), Election of, ...	91
<i>Carychium scalare</i> , ...	138
Celt, from Shillong, Khási Hills, ...	158
Chambers, (Dr. E. W.), Election of, ...	91
Chhanda Sutra, completion of, ...	32
Chand's poems, ...	ib.
Chaudari, (Bábu G. K.), Withdrawal of, ...	196
Chennell, (T. Mr.), Election of, ...	101
<i>Chhim</i> or <i>chitra</i> , ...	173
Chiroptera, inhabiting the Khási Hills, postscript to the list of, ...	85
Chuckerbatty, (Bábu M. C.), Withdrawal of, ...	2
<i>Cladophora macrogonya</i> , ...	96
<i>Clanculus Tonnerrei</i> , ...	185
<i>Clathurella Armstrongi</i> , ...	182
„ <i>Blanfordi</i> , ...	ib.
„ <i>canaliculata</i> , ...	181
„ <i>contortula</i> , ...	182
„ <i>enginceformis</i> , ...	ib.
„ <i>exquisita</i> , ...	181
„ <i>Martensi</i> , ...	ib.
„ <i>Masoni</i> , ...	ib.
„ <i>perplexa</i> , ...	ib.
„ <i>singularis</i> , ...	ib.
„ <i>Smithi</i> , ...	ib.
Clarke, (C. B. Mr.), Withdrawal of, ...	211
<i>Olorida decorata</i> , ...	231
„ <i>Latreillei</i> , ...	ib.
„ <i>microphthalmia</i> , ...	ib.
Coin Cabinet, Report on, ...	35
„ Committee, ...	62
„ from Cochin China, ...	195
„ of Islám Sháh, A. H., 954, ...	43
„ of Kunanda (340 B. C.), from Karnál, ...	85

	<i>Page</i>
Coin posthumous, of A'zam Sháh, from Bihar, ...	112
„ rupee, of Jahángir, A. H. 1030, from Agra, ...	115
Coins, 'Alamgíri and Jahángíri rupee, ...	58
„ of A'zam Sháh and Jalál-uddin Muhammad Sháh, from Bihár, ...	113
„ of Kings of Dilhí and Jaunpúr, ...	135
„ of Mahmud Sháh I of Bengal, from Mahasthán, near Bogra, silver, of Dáúd Sháh of Bengal and of Nara Naráyana of Koch Bihar, ...	195
„ of Kabul, ...	58
„ of Muhammad Khudáyár, of Khokand, ...	ib.
„ of Nuçrat Sháh of Bengal, ...	195
„ of Sháhrukh Bahádur, of Abul Gházi Sultán Husain, Mirzá Bahádur and of 'Alá-uddin Abul Muzaffar Muhammad Sháh, of Dilhí, ...	58
<i>Columbella (Mitrella) balteata</i> , ...	183
„ <i>lactescens</i> , ...	184
„ <i>pardalina</i> , ...	ib.
Conchology, progress in, ...	37
<i>Coronis spinosa</i> , ...	232
Council, Election of, ...	36
Crabs, fresh-water, Indo-Malayan, ...	238
<i>Crossopus fodiens</i> , ...	198
„ <i>Himalaicus</i> , ...	197
Cuñha (Dr. J. G. da), Translations of Portuguese Inscriptions from Mombassa, ...	214
Cunningham, (Dr. D. D.), Member of Library Committee, ...	60
„ „ „ Physical Science Committee, ...	62
„ (Major-Genl. A.), Member of Philological Committee, ...	61
„ „ „ „ Coin Committee, ...	62
<i>Cyclostrema cancellata</i> , ...	184
„ <i>eburnea</i> , ...	ib.
<i>Cyclophorus</i> , ...	140
<i>Cythara dubiosa</i> (? <i>Coniformis</i> , Gray), ...	182
„ <i>Delacourciana</i> , ...	181
„ <i>gradata</i> , ...	ib.
„ <i>Isseli</i> , ...	183
Dafla Hills, Asám, Notes on the Geology of part of the, ...	139
Damant, (G. H. Mr.), Note on the Manipúri Language, ...	140
„ „ on Manipúri MSS., ...	17
Dáúd Sháh, king of Bengal, Coin of, ...	195



Delmerick, (J. G. Mr.), List of rare Muhammadan Coins, of Dihli			
and Jaunpúr,	...	...	138
" " Rubbings from Dihli,	...	...	212
Dihli, Arabic and Persian Inscriptions from,	...	...	ib.
" coins of the Kings of,	...	...	138
Dobson, (G. E. Dr.), Postscript to the List of <i>Chiroptera</i> inhabiting			
the Khási Hills,	...	...	85
Dodgson, (W. Mr.), Election of,	...	...	58
Dorjendranath Thakura (Bábu), Member of Philological Committee,			61
Douglas, (J. Mr.), Election of,	...	...	58
<i>Drillia lucida</i> ,	...	...	180
Duplex Telegraphy,	...	...	38
Durand, (H. M. Mr.), Withdrawal of,	...	...	58
Dyeing and Reeling Wild Silks, correspondence regarding,			129
Earth Currents,	...	...	41
<i>Elachistodon Westermanni</i> , loreal pit in,	...	...	234
Electrical Resistance, unit of,	...	...	39
" of Selenium,	...	...	ib.
Electromotographs,	...	...	40
<i>Euchelus Lamberti</i> ,	...	...	185
Ethnology of Yunan, suggestions on,	...	...	3
<i>Eremias Yarkandensis</i> ,	...	...	201
" <i>vermiculata</i> ,	...	...	202
<i>Eulima acuformis</i> ,	...	...	184
" <i>flexuosa</i> ,	...	...	ib.
" <i>lactea</i> ,	...	...	ib.
<i>Eutrichocheles</i> ,	...	...	231
" <i>modestus</i> ,	...	...	ib.
Ewart, (J. Dr.), Member of Natural History Committee,	...	...	61
Farr, (G. C. Mr.), Election cancelled,	...	...	2
Fasson, (H. J. H. Mr.), Report by, on a Whirlwind in the Maiman-			
singh District,	...	...	103
<i>Felis aurata</i> ,	...	...	198
" <i>Moormensis</i> ,	...	...	ib.
Finance Committee, Nomination of,	...	...	60
" Report on,	...	...	28
Flint cores and flakes from Sakkar and Rohri, Sind,	...	...	134
Forbes, (Capt. C. S. F. S.), Election of,	...	...	1
<i>Francesia</i> ,	...	...	138
Fryer, (Major G. E.), On the Khyeng People of the Sandoway Dis-			
trict, Arakan,	...	...	96

	Page
Fryer, (Major G. E.), Páli Studies, No. I., ...	137
Ganga Prasád Siñha, (Babú), Withdrawal of, ...	91
Ganná Begam, Inscriptions from Tomb of, at Núrábád, near Dholpúr,	117
Gaur, notes on the removal of relics from, ...	93
Gaur Dás Baisák, (Babu), Member of Philological Committee, ...	61
Geography of Yunan, suggestions on, ...	5
Geology of Yunan, suggestions on, ...	6
„ part of Dafia Hills, Asám, ...	139
Ghatot Kacha, ...	46
Ghiyásuddin Abul Muzaffar Jalál Sháh, of Bengal, Inscription of, ...	141
Ghosha, (Bábu Pratápa Chandra), resigns Asst. Secretaryship, ...	108
<i>Gibbula Holdsworthana</i> , ...	185
Girdlestone, (C. Mr.), Election of, ...	127
Glacial Action in the Nágá Hills, ...	185
Godwin-Austen, (Major H. H.), on new species of <i>Stenopidæ</i> from N. E. Bengal, ...	18
„ „ Notes on the Geology of part of the Dafia Hills, Asám, ...	139
„ „ The evidence of past Glacial Action in the Nágá Hills, ...	185
Gomes, (A. D. B. Mr.), Withdrawal of, ...	211
<i>Gonodactylus glyptocercus</i> , ...	232
„ <i>trispinosus</i> , ...	ib.
Gouldsbury, (J. R. E. Mr.), Election of, ...	127
Govindo Kumar Chaudri, (Bábu), Withdrawal of, ...	196
Gowan, (Major-General, J. Y.), Withdrawal cancelled, ...	43
Greek Sculpture, supposed, at Mathura, ...	165
Growse, (F. S. Mr.), Member of Philological Committee, ...	61
„ on Supposed Greek Sculpture at Mathurá, ...	165
„ The Etymology of Local names in Northern India as exemplified in the district of Mathurá, ...	17
Gunn, (J. S. Mr.), Election of, ...	1
Gupta Era, ...	45
<i>Gymnodactylus elongatus</i> , ...	201
„ <i>microtis</i> , ...	ib.
<i>Gymnosporia Gibsoni</i> , ...	202
„ <i>Thomsoni</i> , ...	ib.
Hamilton, (Col. O.), Withdrawal of, ...	44
Hare, large, inhabiting high elevations in Western Tibet, ...	233
Harkness, (T. F. Mr.), Withdrawal of, ...	81
Hector, (Rev. J.), Withdrawal of, ...	127

Heilgers, (W. Mr.), Withdrawal of, ...	...	44
<i>Helicarion gigas</i> , ...	...	18
<i>Hemidactylus Persicus</i> , ...	...	232
Hendley, (Dr. T. H.), Election of, ...	...	58
Herschel, (Sir W. J.), Withdrawal of, ...	...	2
Hewitt, (J. F. Mr.), Election of, ...	...	155
Hindi publications, in the Bibliotheca Indica, ...	...	33
<i>Hippocratea Nicobarica</i> , ...	...	202
Howell, (A. P. Mr.), Withdrawal of, ...	...	81
Hume, (A. O. Mr.), Member of Natural History Committee, ...	...	61
Hyde, (Col. H., R. E.), Elected Vice-President, ...	...	35
" " Member of Finance and Library Committees, ...	...	60
" " " Physical Science and Coins Committees, ...	...	62
" " Trustee of the Indian Museum, ...	...	109
Ibex, Sind, note on the Scientific name of, ...	...	120
Ibráhím Náib Bárbak, Mosque of, at Jaunpúr, ...	...	14
<i>Ilex Sikkimensis</i> , ...	...	202
'Imárát-ul-Akbar, a work on Ágrah, ...	...	117
Indian Museum, ...	...	28
Ink used for Sanskrit MSS. ...	...	67
Inscription, Asoka, from Chandan Pír Shahíd Hill, near Sahasráram, copy of, ...	...	155
" from Ahirí Zamíndárí, Chándah District, ...	...	62
" from a child's tomb inside the Rauzah of Mirzá Muqím, ...	...	213
" from the courtyard of Amír Khusráu's Tomb, ...	...	214
" from Dinájpúr and Sherpúr Murchah, ...	...	141
" from the Draupadi-kunda at S'ivapura, near Banáras, ...	...	83
" from the gate east of Kuṭb Sáhib, ...	...	213
" from the Jámí Mosque in Srínagar, Kashmír, ...	...	113
" from the Manikarniká-kunda or Chakrapuskarini-tirtha at Banáras, ...	...	82
" from the Mazár at Dáúd Sarái, near Dilhí, ...	...	212
" from the Mihráb of the Mosque outside the gate of Nizámuddín's well, near Dilhí, ...	...	ib.
" from a Mosque in Híng kí Mandí, Ágrah, ...	...	115
" from Núrábád near Dholpúr, ...	...	117
" from the Panchagangá Ghát at Banáras, ...	...	83
" from the Rauzah of Muhammad Sharíf i Balkhí, outside Nizámuddín's well, near Dilhí, ...	...	213
" from the second Mazár at Dáúd Sarái, ...	...	ib.

	Page
Inscriptions from Srinagar near Madhipúrah, Bhágalpúr District, ...	107
"    of the time of Skanda Gupta from Indor Kherá, on the Ganges, ... ..	45
"    from a tomb in the courtyard of Nizámuddín, near Dihlí,	213
"    from the tomb of Sayyid Nárullah Shustarí, Ágrah, ...	116
"    Portuguese, on the walls of the Fort of Mombassa, ...	214
Islám Sháh, Coin of, ... ..	43
Jamra Chandithán, or Baróntpur, Buddhist Shrine of, ...	128
Jaunpúr, Coins of the Kings of, ... ..	138
"    Inscriptions from, ... ..	14
Johnstone, (J. W. Dr.), Election cancelled, ... ..	2
Jones, (S. S. Mr.), Election of, ... ..	196
Kabiruddín Ahmad (Sahib Maulavi), Member of Philological Com- mittee, ... ..	61
Kanishka, dates of, ... ..	46
Kerr, (Major Lord Ralph), Election of, ... ..	81
Khyeng People, of the Sandoway District, Arakan, ...	96
Kimber, (J. Mr.), Withdrawal of, ... ..	81
King, (G. Dr.), Member of Natural History Committee, ...	61
"    (L. B. B. Mr.) on the relics from Gaur, ... ..	93
Knight, (J. B. Mr.), Election of, ... ..	211
Knight, (R. Mr.), Withdrawal of, ... ..	196
Kunanda, Coin of, found at Karnál, ... ..	85, 165
Kurz, (S. Mr.), Member of Natural History Committee, ...	61
"    Description of twenty-one new Indian Plants, ...	202
"    Description of new species of Oaks, ... ..	202
"    on a new species of <i>Tupistra</i> from Upper Tenas- serim, ... ..	200
Lafont, (F. E. Rev.) Member of Physical Science Committee, ...	62
"    on the question of a Spectroscopic Observatory, ...	58
<i>Lagomys Curzonæ</i> , ... ..	197
Landshells from Aden, ... ..	138
<i>Latirus gibbus</i> , ... ..	184
La Touche, (Capt. E. A. D.), Election of, ... ..	81
Leonard, (G. S. Mr.), appointed Asst. Secretary, ... ..	108
Leprosy, notices of, by Sanskrit writers, ... ..	160
<i>Lepus pallipes</i> , ... ..	198, 233
" <i>hypsius</i> , ... ..	ib.
Lewis, (T. R. Dr.), Elected Member of Council, ... ..	36
"    Elected Secretary, ... ..	ib.
"    nominated a Trustee of the Indian Museum, ...	82

	Page
Library, Additions to the, 19, 49, 77, 86, 99, 123, 147, 189, 203,	234
„ Report on, ... ..	31
„ Committee, ... ..	60
List of Societies, Institutions, &c., with which exchanges of publica- tions have been made during 1874, ... ..	33
Lizards from Sind, ... ..	232
Lockwood, (E. D. Mr.), Election of, ... ..	2
„ „ on perforated stone implements found in the River Mun, ... ..	102
<i>Lophopetalum fuscescens</i> , ... ..	202
Lydekker, (R. Mr.), Election of, ... ..	1
„ Member of Natural History Committee, ... ..	61
Lyall, (A. C. Mr.), Withdrawal of, ... ..	91
Mahásthán near Bagurá (Bogra), in E. Bengal, note on, ... ..	141
Mahendralal Sircar, Dr., Member of Library Committee, ... ..	60
„ „ „ Philological Committee, ... ..	61
Mahmúd Sháh, of Bengal, Coins of, ... ..	141
„ „ of Dilhi, Coins of, ... ..	138
„ „ Náçiruddín Abul Mujahid, of Jaunpúr, Coins of, ... ..	ib.
Maimansingh District, report of a Whirlwind in the, ... ..	103
„ „ destructive storm in, ... ..	128
Malik Haidar, of Kashmír, ... ..	114
Mammalia, collected by Dr. Stoliczka in Yarkand, &c. ... ..	186
„ Tibetan, Skins of, ... ..	197
<i>Mangelia Fairbanki</i> , ... ..	180
„ <i>fulvocincta</i> , ... ..	ib.
Manipúrí MSS., forwarded by Mr. G. H. Damant, ... ..	17
„ Language, note on the, ... ..	140
<i>Marginella Isseli</i> , ... ..	185
„ <i>pygmaea</i> , ... ..	ib.
Marmots, inhabiting the Himalayas and Tibet, ... ..	186
Markhor, note on the scientific name of, ... ..	120
Marsh, (Capt. H. C.), reading of Inscriptions from Kashmír, ... ..	113
Martin, (W. B. Mr.), letter regarding an Inscription found at Srina- gar in the Bhágálpur District, ... ..	107
„ (H. B. Mr.), regarding Buddhist Shrines, in Bhágálpur, ... ..	128
McConnell, (Dr. J. F. P.), Election of, ... ..	91
Medlicott, (H. B. Mr.), remarks on rediscovery of Damuda rocks in Asám, ... ..	189
Meeting, Monthly General, 1, 27, 57, 82, 92, 101, 128, 155, 195,	211
Members, List of, ... ..	ii.

	Page
<i>Mesocarpus scalaris</i> , ... ..	96
Meteorology of Yunan, suggestions for observations on, ...	4
Miles, (Lieut.-Col. S. B.), Translation of extracts from an Arabic work relating to Aden, ... ..	218
Minchin, (Lt.-Col.), Election of, ... ..	155
<i>Minolia variabilis</i> , ... ..	185
<i>Mitra amanda</i> , ... ..	ib.
„ <i>Antoniae</i> , ... ..	ib.
„ <i>cruentata</i> , ... ..	ib.
„ <i>pretiosa</i> , ... ..	ib.
Mitra (Rājendralāla, Bābu), letter from, regarding a mistake in his paper on Skanda Gupta inscription, ...	163
„ „ „ on a Coin of Kunanda, found at Karnāl, 85, 164	164
„ „ „ on a copper-plate Inscription of the time of Skanda-Gupta, ...	45
„ „ „ on notices of Leprosy by Sanskrit writers, ...	160
„ „ „ Remarks on supposed Greek Sculpture at Mathurā, ...	166
„ „ „ Report on the operations for collecting information regarding Sanskrit MSS. in native libraries, ...	63
<i>Mollusca</i> Marine, new species of, from Indian Ocean, ...	180
Mombassa, Fort of, Portuguese inscriptions on the walls of the, ...	214
Mubārak Sháh, of Dihlí, Coins of, ... ..	138
Muhammad Ibráhm, of Dihli, Coins of, ... ..	ib.
Mukerjea, (Bābu V. V.), Election cancelled, ... ..	2
Munroe, (Dr. W.), queries regarding mention of Leprosy by Hindu writers, ... ..	160
Murád Bakhsh Sháh, Coin of, ... ..	138
<i>Murex Crossiana</i> , ... ..	184
„ <i>Lienardi</i> , ... ..	185
<i>Mygale stridulans</i> , ... ..	197
„ <i>Javanica</i> , ... ..	ib.
Nāciruddín Abul Mujáhid Mahmúd Sháh, of Jaunpur, Coins of, ...	138
Nágá Hills, past Glacial Action in the, ... ..	185
Nāra Nārāyana, of Koch Bihār, Coin of, ... ..	195
<i>Nassa obesa</i> , ... ..	183
<i>Natsiatopsis thunbergiaefolia</i> , ... ..	202
Natural History Committee, ... ..	61
<i>Nectogale elegans</i> , ... ..	198
Nevill, (G. and H. Messrs.), Descriptions of new species of Marine <i>Mollusca</i> , from the Indian Ocean, ... ..	180

Núrábád, near Dholpúr, Inscriptions from, ...	117
Nuṣrat Sháh, King of Bengal, Coin of, ...	195
O'Brien, (B. Mr.), Election cancelled, ...	2
„ (E. Mr.), Election cancelled, ...	2
<i>Oedogonium</i> , ...	96
„ <i>tenellum</i> , ...	ib.
Office-bearers' election of, ...	35
Officers, Report on, ...	31
O'Kinealy, (J. Mr.), Member of Coin Committee, ...	62
„ „ „ Council, ...	36
Oldham, (T. Dr.), Elected Vice-President, ...	35
„ „ Elected Member of Council, ...	36
„ „ Member of Finance Committee, ...	60
„ „ „ Physical Science Committee, ...	62
„ „ Elected President of the Society, ...	82
O'Donnell, (C. J. Mr.), Election of, ...	155
„ „ Note on Mahásthán near Bagurá (Bogra), ...	141
Orissa, Antiquities of, ...	42
<i>Oscillaria Jumnae</i> , ...	96
Páli Studies, No. I., by Major G. E. Fryer, ...	137
Palm-leaf MSS., ...	65
Paper used for Sanskrit MSS. ...	64
<i>Paratelphusa</i> , genus, Distribution of the, ...	230
<i>Paratelphusa crenulifera</i> , ...	231
„ <i>Dayana</i> , ...	230
„ <i>Edwardsi</i> , ...	231
„ <i>Martensi</i> , ...	230
Partridge, (Dr S. B.), Nominated a Trustee of the Indian Museum, ...	58
Peal, (S. E. Esq.), Member of Natural History Committee, ...	61
Pens used for Sanskrit MSS. ...	67
Peppé, (J. T. Mr.), Withdrawal of, ...	196
Persian Publications, in the Bibliotheca Indica, ...	33
Philological Committee, ...	61
<i>Phœnicopterus Andersoni</i> , ...	17, 48
„ <i>antiquorum</i> , ...	17
„ <i>antiquus</i> , ...	18
„ <i>roseus</i> , ...	48
Photographs of ancient architectural remains in Chutiá Nágpúr, ...	211
„ of ancient Temples at Barwa Ságar, Barauli, in the Jhānsi District and of Muhammadan buildings at Badāon and Kol, ...	195

	<i>Page</i>
Photographs of Boro-Boëdoër, ... ..	196
„ of colossal granite image in Tinevelly District, ...	1
„ of Copper Sasanas, from Dr. Bühler, ...	155
„ of Nicobar Islands, ... ..	101
„ of Sculptures from Barahut, ... ..	44
„ of the extreme red rays of the Solar Spectrum, ...	199
Photography in connection with the Transit of Venus, ...	185
„ suggestions on, for Yunan Mission, ...	12
<i>Phrynocephalus axillaris</i> , ... ..	201
„ <i>maculatus</i> , ... ..	<i>ib.</i>
Physical Science Committee, ... ..	61
<i>Platyceps semifasciatus</i> , ... ..	234
<i>Pometia macrocarpa</i> , ... ..	202
Prannath Pandit (Babu), Elected Member of Council, ...	36
„ „ Member of Philological Committee, ...	61
Pratt, (Mr.), letter regarding a destructive storm in Maimansingh District, ... ..	128
Presentations, list of, 1, 43, 57, 81, 91, 101, 128, 155, 195, ...	211
President's Address, ... ..	36
<i>Prionodon pardicolor</i> , ... ..	197
Proceedings of the Zoological Gardens Committees, Abstract of the, ..	142
<i>Pteromys magnificus</i> , ... ..	197
<i>Ptyodactylus homolepis</i> , ... ..	232
„ <i>Hasselquisti</i> , ... ..	<i>ib.</i>
Publications, Report on, ... ..	31
Pulin Behary Sen, (Babu), Death of, ... ..	28
<i>Quercus mespilifolia</i> , ... ..	202
„ <i>olla</i> , ... ..	<i>ib.</i>
„ <i>pachyphylla</i> , ... ..	<i>ib.</i>
„ <i>xylocarpus</i> , ... ..	<i>ib.</i>
Raff'uddarajât, of Dihli, Coins of, ... ..	138
Raff'uddaulâh, of Dihli, Coins of, ... ..	<i>ib.</i>
Rahta Chandithân, or Bhawanipûr Rahta, Buddhist Shrine of, ...	128
Rainey, (H. J. Mr.), on the Scientific Appellation of the common striped Squirrel ( <i>Sciurus palmarum</i> , Linn.). ...	159
Raja Chandranath Roy, of Nátor, Withdrawal of, ...	211
Râm Nárâyan, Translation of the Ayodhyâ Mâhâtmya, or Pilgrim-age to Ayodhyâ, ... ..	138
Reptilia of E. Turkistân, collected by Dr. Stoliczka, ...	201
<i>Rhinoceros Sondaicus</i> , ... ..	229
„ <i>Indicus</i> , ... ..	<i>ib.</i>



	Page
<i>Ringicula abbreviata</i> , ...	180
" <i>acuta</i> , ...	185
" <i>minuta</i> , ...	<i>ib.</i>
<i>Rissoina abnormis</i> , ...	184
Robinson, (D. G. Col.), Member of Physical Science Committee, ...	62
Ross, (Capt. J. C.), Withdrawal of, ...	196
<i>Salacia Jenkinsii</i> , ...	202
" <i>platyphylla</i> , ...	<i>ib.</i>
Sañgharakkhita Thera, the Ceylon Grammarian, ...	137
Sanitation, in Yunan, suggestions on, ...	11
Sanskrit MSS., Report on, ...	63
"    publications, in the Bibliotheca Indica, ...	33
<i>Sapindus tomentosa</i> , ...	202
" <i>microcarpus</i> , ...	<i>ib.</i>
Sayyid Muhammad Khudáyár, of Khoqand, Coins of, ...	58
"    Núrullah Shustarí, Inscriptions from the tomb of, at Ágrah, ...	116
<i>Schizothrix aurantiaca</i> , ...	96
Schwendler, (L. Mr.), exhibits <i>Ailurus fulgens</i> , ...	98
"    "    exhibits some specimens of telegraph cable, penetrated by grass, ...	158
"    "    exhibits a four-horned Sheep, from Sind, ...	186
<i>Scuiropterus caniceps</i> , ...	197
" <i>alboniger</i> , ...	<i>ib.</i>
" <i>villosus</i> , ...	<i>ib.</i>
<i>Sciurus lokriah</i> or <i>lokrioides</i> , ...	193
" <i>Maclellandi</i> , ...	197
" <i>macruroides</i> , ...	<i>ib.</i>
" <i>palmarum</i> , ...	159
Selenium, action of Light on Electrical resistance of, ...	39
Sháhjahán, Coins of, ...	138
Sháhrúkh Bahádur, Coins of, ...	58
Shaw, (R. B. Mr.), Letter from, regarding antiquities in E. Turkis- tán, ...	91
Sheep, four-horned, from Sind, ...	186
Shells, Land and Freshwater, of India and Burmah, ...	140
Silk, wild Indian, reeling and dyeing of, ...	129
Sime, (J. Mr.), Withdrawal of, ...	82
<i>Sistrum fiscellum</i> , ...	185
" <i>ventricosulum</i> , ...	184
Skanda Gupta, Inscription of the time of, from Indor, on the Ganges, ...	45
Skulls of Lushais and other tribes of N. E. Frontier, measurement of, ...	97

	Page
Smidt, (J. Mr.), Election of, ...	43
Societies exchanging publications, list of, ...	33
Spectroscopic Observatory, erection of, ...	58
"    "    grant of Rs. 500 for, ...	59
Spectrum, solar, photographs of extreme red rays of, ...	199
Spider, stridulating, ...	197
<i>Spirogyra dubia</i> , ...	96
" <i>irregularis</i> , ...	ib.
" <i>subaequa</i> , ...	ib.
Sponge, Freshwater, ...	1
<i>Squilla supplex</i> , ...	232
Squirrel, common striped, scientific appellation of, ...	159
Srinagar, Bhāgalpur District, Inscription from, ...	107
"    Kashmir, Inscriptions from, ...	113
St. John, (R. T. Mr.), Election of, ...	2
<i>Stellio nuptus</i> , ...	232
" <i>Stoliczkanus</i> , ...	201
<i>Stenodactylus orientalis</i> , ...	232
Stewart, (G. M. Mr.), Election of, ...	127
Stokes, (Whitley, Mr.), Member of Library Committee, ...	60
"    "    "    Philological Committee, ...	61
Stoliczka Memorial Fund, ...	109
Stone implements, from the bed of the river Mun at Kharakpur, Mon-	
ghyr District, ...	102
"    from the Khāsi Hills, ...	158
"    of Burmese type found in Dálbhúm, Chutiá	
Nágpur, ...	118
Storm in the Maimansingh District, ...	128
Stubbs, (F. W. Col.), Member of Coins Committee, ...	62
"    "    Presentation of coins by, ...	57
Súlvasútras, On the, ...	200
Sun's Heat, variation in, ...	120
Tājuddín Abul Muzaffar Murád Bakhsh Sháh, of Dihli, Coins of, ...	138
<i>Tallorbia roseola</i> , ...	185
Tawney, (C. H. Mr.), Member of Library Committee, ...	60
"    "    "    Philological Committee, ...	61
Telegraph cable, penetration of, by grass, ...	158
Telegraphy, Duplex, ...	38
Theobald, (W. Mr.), Member of Physical Science Committee, ...	62
"    "    Exhibits perforated stones from the bed of the	
river Mún at Kharakpúr, ...	102

Theobald, (W. Mr.), Observations on some Indian and Burmese species of <i>Trionyx</i> , with a rectification of their Synonymy and a description of two new species, ...	170
Thibaut, (Dr. G.), Election of, ...	101
"    "    Member of the Philological Committee, ...	134
"    "    on the <i>Súlvasutras</i> , or Notes on the beginning of Geometry in India, ...	200
Thomas, (E. Mr.), remarks on Bábu Rájendralála Mitrá's paper on a coin of Kunanda, ...	163
Thomson, (R. G. Mr.), Election of, ...	196
Tilbegampúr, near Dihli, Inscriptions from, ...	15
Transit of Venus, ...	41, 185
<i>Trapelus rubrigularis</i> , ...	233
<i>Trionyx</i> , Indian and Burmese species, of, ...	170
" <i>ephippium</i> , ...	178
" <i>Gangeticus</i> , ...	171
" <i>Grayii</i> , ...	176
" <i>hurum</i> , ...	171
" <i>Javanicus</i> , ...	176
" <i>ocellatus</i> , ...	174, 175
" <i>Peguensis</i> , ...	176
" <i>Phayrei</i> , ...	175
" <i>sewaare</i> , ...	172, 178
" <i>stellatus</i> , ...	171, <i>ib.</i>
<i>Trochus Satrapius</i> , ...	185
Trustees of Indian Museum on the part of the Society, ...	28
Tughluq Sháh, Coins of, ...	138
<i>Tupistra</i> , on a new species of, from Upper Tenasserim, ...	200
<i>Tupistra Stoliczkana</i> , ...	<i>ib.</i>
Tursa village, Chándah District, Inscribed stone found near, ...	63
Tween, (A. Mr.), Member of Physical Science Committee, ...	62
<i>Urva cancrivora</i> , ...	197
<i>Vaucheria Kurzii</i> , ...	96
<i>Vitis costata</i> , ...	202
" <i>neurosa</i> , ...	<i>ib.</i>
" <i>Vicarayana</i> , ...	<i>ib.</i>
Waagen, (Dr. W.), Member of Library and Natural History Committees, ...	60
Wall, (Dr. A. J.), Election of, ...	81
<i>Walsura oxycarpa</i> , ...	202

	Page
Waterhouse, (Capt. J.), exhibits photographs of the solar spectrum, showing the extreme red rays, ...	198
"    "    Photography in connection with the observation of the Transit of Venus at Roorkhee, December 9th, 1874, ...	185
Westwood, (Prof. J. O.), Elected an Honorary Member, ...	196
Whirlwind in the Maimansingh District, ...	103
Whiteway, (R. S. Mr.), Election of, ...	43
Willson, (W. G. Mr.), Member of Library Committee, ...	60
"    "    Physical Science Committee, ...	62
"    "    remarks on variation of Solar Heat, ...	122
"    "    remarks on Whirlwind in Bengal, ...	107
Wise, (Dr. J.), The Bárah Bhúyas of Bengal, No. II., ...	141
Wood-Mason, (J. Mr.), Exhibits a specimen of a gigantic Spider of the Genus <i>Mygale</i> , describes its stridulating apparatus, and proposes to name it <i>M. stridulans</i> , ...	197
"    "    exhibits photographs of <i>Rhinoceros Sondaicus</i> and <i>Indicus</i> , ...	280
"    "    exhibits the materials for his Monograph of <i>Paratelphusa</i> , and shortly describes three new species, ...	230
"    "    exhibits a specimen of the <i>Astacus modestus</i> of Herbst, and makes it the type of a new genus of macrurous Crustaceans, ...	231
"    "    exhibits and briefly describes several new species of stomatopod Crustaceans, ...	231
"    "    on the cranial characteristics of mongoloid tribes of N. E. Frontier, with table of measurements, ...	97
"    "    on the young of certain species of <i>Trionyx</i> , and on the colours of extinct animals, ...	179
Wood, (C. H. Mr.), Member of the Physical Science and Library Committees, ...	197
Yunan Expedition, Suggestions for the, ...	2
<i>Zafra polita</i> , ...	183
" <i>semisculpta</i> , ...	183
<i>Zamenis ventrimaculatus</i> , ...	234
<i>Zanthoxylon Andamanicum</i> , ...	202
Zeller, (Dr. G.), Algarum Species in India orientali centrali collectæ, ...	96
Zoological Garden Scheme, ...	41, 142

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.065	30.139	30.014	0.125	67.0	76.3	59.4	16.9
2	.075	.146	.025	.121	67.6	76.5	60.5	16.0
3	.056	.137	.003	.134	67.8	77.3	59.8	17.5
4	29.975	.060	29.917	.143	69.3	79.5	62.0	17.5
5	.953	.032	.865	.167	66.4	75.5	62.0	13.5
6	30.016	.084	.957	.127	63.0	70.5	56.8	13.7
7	.056	.134	30.012	.122	63.6	72.0	56.9	15.1
8	29.994	.055	29.941	.114	64.4	72.4	57.3	15.1
9	.977	.033	.921	.112	65.7	74.2	58.4	15.8
10	.985	.058	.940	.118	67.7	76.8	60.5	16.3
11	.954	.032	.888	.144	69.1	78.5	62.4	16.1
12	.892	29.964	.833	.131	70.8	80.0	64.5	15.5
13	.879	.952	.833	.119	70.7	78.0	65.6	12.4
14	.879	.941	.828	.113	70.3	78.5	64.2	14.3
15	.904	.968	.860	.108	68.0	76.2	62.3	13.9
16	.883	.958	.814	.144	66.8	76.5	59.3	17.2
17	.861	.924	.824	.100	69.0	79.0	61.0	18.0
18	.805	.889	.731	.158	71.6	79.0	65.7	13.3
19	.813	.885	.726	.159	67.4	71.3	63.0	8.3
20	.881	.959	.836	.123	65.6	74.6	60.0	14.6
21	.893	.953	.837	.116	66.9	73.2	63.0	10.2
22	.978	30.057	.933	.124	63.1	71.0	56.5	14.5
23	.995	.069	.958	.111	62.2	72.0	53.8	18.2
24	.999	.065	.954	.111	63.4	73.6	54.8	18.8
25	.991	.044	.949	.095	65.7	75.0	56.4	18.6
26	30.011	.093	.958	.135	62.8	65.8	60.0	5.8
27	.028	.104	.989	.115	63.6	71.2	59.0	12.2
28	.055	.135	30.013	.122	65.3	74.2	58.5	15.7
29	.050	.136	29.993	.143	64.2	73.2	55.8	17.4
30	.013	.085	.951	.134	65.5	75.7	55.5	20.2
31	.033	.085	.978	.107	65.3	70.5	60.0	10.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	61.6	5.4	57.3	9.7	0.478	5.28	2.02	0.72
2	62.6	5.0	58.6	9.0	.490	.52	1.92	.74
3	62.7	5.1	58.6	9.2	.490	.52	.96	.74
4	64.2	5.1	60.1	9.2	.525	.78	2.05	.74
5	63.9	2.5	61.9	4.5	.557	6.17	1.00	.86
6	59.1	3.9	55.6	7.4	.452	5.05	.40	.78
7	59.4	4.2	55.6	8.0	.452	.04	.53	.77
8	60.1	4.3	56.2	8.2	.461	.13	.61	.76
9	61.5	4.2	58.1	7.6	.491	.44	.58	.78
10	64.1	3.6	61.2	6.5	.544	6.01	.45	.81
11	65.5	3.6	62.6	6.5	.570	.28	.50	.81
12	67.3	3.5	64.5	6.3	.607	.68	.52	.82
13	66.7	4.0	63.5	7.2	.588	.46	.72	.79
14	64.9	5.4	60.6	9.7	.534	5.86	2.22	.73
15	61.7	6.3	56.7	11.3	.469	.17	.36	.69
16	60.0	6.8	54.6	12.2	.437	4.84	.42	.67
17	64.3	4.7	60.5	8.5	.532	5.86	1.90	.76
18	68.1	3.5	65.3	6.3	.623	6.85	.55	.82
19	65.3	2.1	63.6	3.8	.590	.52	0.87	.88
20	63.0	2.6	60.9	4.7	.539	5.98	1.02	.85
21	62.8	4.1	59.5	7.4	.515	.70	.58	.78
22	54.7	8.4	47.1	16.0	.398	3.77	2.70	.58
23	54.8	7.4	48.1	14.1	.350	.91	.38	.62
24	56.7	6.7	50.7	12.7	.382	4.27	.26	.65
25	59.1	6.6	53.8	11.9	.425	.71	.31	.67
26	60.3	2.5	58.0	4.8	.489	5.45	0.96	.85
27	61.3	2.3	59.2	4.4	.509	.68	.89	.87
28	60.5	4.8	56.7	8.6	.469	.19	1.74	.75
29	57.5	6.7	51.5	12.7	.493	4.37	2.32	.65
30	58.5	7.0	52.9	12.6	.412	.58	.40	.66
31	60.3	5.0	56.3	9.0	.462	5.14	1.79	.74

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.966	30.078	29.757	0.321	63.6	71.0	57.2	13.8
1	.959	.071	.751	.320	63.0	70.5	56.7	13.8
2	.951	.062	.738	.324	62.5	70.0	56.1	13.9
3	.943	.053	.730	.323	61.9	69.0	55.5	13.5
4	.939	.059	.726	.333	61.4	68.5	55.0	13.5
5	.947	.054	.735	.319	61.0	68.0	54.5	13.5
6	.962	.072	.751	.321	60.5	67.5	54.1	13.4
7	.981	.092	.792	.300	60.1	65.7	53.8	11.9
8	30.005	.114	.824	.290	61.4	68.0	55.7	12.3
9	.032	.146	.856	.290	64.6	72.0	60.4	11.6
10	.036	.140	.879	.261	67.7	75.4	61.7	13.7
11	.009	.121	.868	.253	70.0	76.0	63.5	12.5
Noon.	29.990	.095	.824	.271	71.9	79.0	63.5	15.5
1	.961	.067	.787	.280	73.0	78.8	63.3	15.5
2	.937	.041	.762	.279	74.0	79.0	61.5	17.5
3	.925	.025	.732	.293	74.2	80.0	61.0	19.0
4	.922	.030	.743	.287	73.0	78.0	61.0	17.0
5	.929	.045	.735	.310	71.8	76.2	60.5	15.7
6	.939	.052	.731	.321	69.5	73.5	60.0	13.5
7	.953	.069	.747	.322	67.9	72.7	60.0	12.7
8	.966	.089	.764	.325	66.7	71.7	60.5	11.2
9	.974	.094	.754	.340	65.8	71.5	60.2	11.3
10	.976	.098	.765	.333	65.0	71.2	58.8	12.4
11	.973	.093	.765	.328	64.2	71.6	58.0	13.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	60.9	2.7	58.5	5.1	.0498	5.54	1.03	0.84
1	60.5	2.5	58.2	4.8	.493	.49	0.96	.85
2	60.1	2.4	57.9	4.6	.488	.44	.91	.86
3	59.6	2.3	57.5	4.4	.481	.39	.84	.87
4	59.1	2.3	57.0	4.4	.473	.30	.84	.86
5	58.7	2.3	56.6	4.4	.467	.24	.82	.87
6	58.4	2.1	56.5	4.0	.465	.22	.75	.87
7	58.1	2.0	56.3	3.8	.462	.19	.70	.88
8	59.1	2.3	57.0	4.4	.473	.30	.84	.86
9	60.8	3.8	57.8	6.8	.486	.40	1.38	.80
10	62.5	5.2	58.3	9.4	.494	.46	2.00	.73
11	63.4	6.6	58.1	11.9	.491	.40	.60	.68
Noon.	63.7	8.2	57.1	14.8	.475	.20	3.28	.61
1	63.9	9.1	56.6	16.4	.467	.11	.65	.58
2	64.2	9.8	57.3	16.7	.478	.21	.83	.58
3	64.2	10.0	57.2	17.0	.476	.19	.90	.57
4	63.5	9.5	55.9	17.1	.456	4.98	.78	.57
5	63.7	8.1	57.2	14.6	.476	5.21	.24	.62
6	63.8	5.7	59.2	10.3	.509	.62	2.26	.71
7	63.4	4.5	59.8	8.1	.520	.74	1.77	.76
8	62.9	3.8	59.9	6.8	.521	.77	.46	.80
9	62.4	3.4	59.7	6.1	.518	.75	.29	.82
10	61.9	3.1	59.4	5.6	.513	.69	.18	.83
11	61.4	2.8	58.9	5.3	.504	.61	.08	.84

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Mile.	
1	125.5	...	N W & N by W	...	116.3	B. Slightly foggy from 7 to 10 P. M.
2	132.0	...	N by W, N & N W	...	101.3	B.
3	122.3	...	N W & W N W	...	60.1	B. Slightly foggy from 8 to 11 P. M.
4	134.0	...	W N W & S S W	...	61.2	B. Sheet L on N at 11 P. M. Slightly foggy at midnight 1 A. M. & 7 P. M.
5	122.0	1.00	S by W & S E	1.4	70.8	Chiefly S. Slightly foggy at 3 & 4 A. M. Sheet L on N at midnight T & L from 1½ to 3 P. M. Hailstone at 2½ P. M. R from 2½ to 3½ & at 5½ P. M.
6	126.4	...	N N E & N N W	...	138.8	S to 1 A. M., ~i to 3 A. M. B to Noon, ~i to 4 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.
7	126.5	...	N N W & N	...	116.2	B to 11 A. M., ~i to 1 P. M., ~i to 4 P. M. B to 11 P. M. Slightly foggy at 7 & 8 P. M.
8	126.0	...	N by W & N W	...	59.3	B to 10 A. M., ~i to 6 P. M. B to 11 P. M. Slightly foggy from 4 to 7 A. M. & 8 to 10 P. M.
9	130.3	...	W N W & E S E	...	62.8	B to 10 A. M., ~i to 3 P. M., ~i to 5 P. M. B to 11 P. M. Slightly foggy from 6 to 8 A. M.
10	134.0	...	E S E & S E	...	36.2	B to 9 A. M., ~i to 11 A. M., ~i to 5 P. M. B to 11 P. M.
11	124.0	...	S E & S	...	71.5	B to 8 A. M. ~i to 4 P. M. B to 11 P. M.
12	129.9	...	S by W & S W	...	132.3	B to 5 A. M., ~i to 8 A. M., ~i to 11 P. M.
13	120.0	0.03	S E	...	101.2	~i to 3 A. M. B to 5 A. M. S to 7 A. M., ~i to 4 P. M., ~i to 6 P. M. B to 11 P. M. Slightly foggy from 8 to 10 P. M. Light R at 2½ & 5½ A. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of January 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Mies.	
14	126.0	...	SE, ESE & N	...	56.1	Seeds to 7 A. M., \i to 9 A. M. B to Noon, \i to 2 P. M., \i to 4 P. M. B to 11 P. M.
15	121.0	...	NE, NbyE & NNE	...	96.9	B to 4 A. M., \i to 6 A. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.
16	128.8	...	NE & S by W	...	88.0	B to 2 P. M., \i to 5 P. M., \i to 7 P. M. B to 11 P. M. Slightly foggy from 7 to 10 P. M.
17	130.0	0.06	S by W & SSW	...	94.9	B to 4 A. M., \i to 6 P. M. B to 8 P. M., \i to 11 P. M. Light R between 4 & 5 P. M.
18	130.5	...	SSW & SW	5.2	180.3	B to 5 A. M., \i to 11 P. M. Brisk wind from 12½ to 6 P. M. T at 3½ & 9½ P. M. Sheet L at 8 & 9 P. M. D at 3½ & 8 P. M.
19	113.0	...	W by N & E by N	...	244.3	B to 6 A. M. S to 11 A. M. O to 2 P. M. B to 11 P. M. Foggy from 7 to 11 A. M.
20	127.0	...	E by N & ENE	...	116.4	S to 7 A. M. O to 11 A. M., \i to 5 P. M., \i to 8 P. M. Seeds to 11 P. M. Foggy from 2 to 6 A. M.
21	123.5	...	NE & NW	...	161.8	Clouds of different kinds.
22	129.5	...	NNW, N & NbyE	...	198.4	\i to 1 A. M. B to 11 P. M.
23	124.5	...	NbyE & NW	...	91.1	B. Slightly foggy from to 7 11 P. M.
24	132.0	...	NW, N by W & E [NE] [SSE]	...	52.0	B. Foggy from Midnight to 6 A. M. & 7 to 11 P. M.
25	122.0	...	E by N, S by W &	...	17.0	B to 8 A. M., \i to 11 P. M. Slightly foggy at midnight & 1 & from 5 to 8 A. M. D at 6 P. M.
26	...	0.18	SSE & E	...	23.8	\i to 3 A. M. O to 11 P. M. Light R from 8 A. M. to 5 P. M.
27	119.2	...	E & ENE	...	51.2	O to 10 A. M. \i to 6 P. M. B to 11 P. M. Slightly foggy from 8 to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles.	
28	123.5	...	E by N & N E	...	35.6	B to 10 A. M., ~i to 1 P. M. ~i to 4 P. M. B to 11 P. M. Foggy at midnight
29	123.8	...	N E & N by E	...	67.1	B. Slightly foggy from 7 to 10 P. M.
30	124.5	...	N by E, NNE & SE	...	41.5	B to 7 A. M., ~i to 1 P. M. B to 3 P. M. O to 11 P. M. Slightly foggy at midnight.
31	97.5	...	S E, E N E & N	...	77.0	O to 7 A. M., ~i to 10 A. M. O to 1 P. M., ~i to 5 P. M. O to 7 P. M. B to 11 P. M. D at 4½ A. M.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimb,  
~i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

## MONTHLY RESULTS.

---

	Inches.
Mean height of the Barometer for the month ... ..	29.966
Max. height of the Barometer occurred at 9 A. M. on the 2nd ...	30.146
Min. height of the Barometer occurred at 4 A.M. on the 19th ...	29.726
<i>Extreme range</i> of the Barometer during the month ... ..	0.420
Mean of the daily Max. Pressures ... ..	30.038
Ditto ditto Min. ditto ... ..	29.912
<i>Mean daily range</i> of the Barometer during the month ... ..	0.126

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	°
Mean Dry Bulb Thermometer for the month ... ..	66.4
Max. Temperature occurred at 3 P. M. on the 12th ... ..	80.0
Min. Temperature occurred at 7 A. M. on the 23rd ... ..	53.8
<i>Extreme range</i> of the Temperature during the month ... ..	26.2
Mean of the daily Max. Temperature ... ..	74.8
Ditto ditto Min. ditto, ... ..	59.8
<i>Mean daily range</i> of the Temperature during the month ... ..	15.0

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Mean Wet Bulb Thermometer for the month ... ..	61.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	4.7
Computed Mean Dew-point for the month ... ..	57.9
Mean Dry Bulb Thermometer above computed mean Dew-point ...	8.5

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.488

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.39
Additional Weight of Vapour required for complete saturation ...	1.78
Mean degree of humidity for the month, complete saturation being unity	0.75

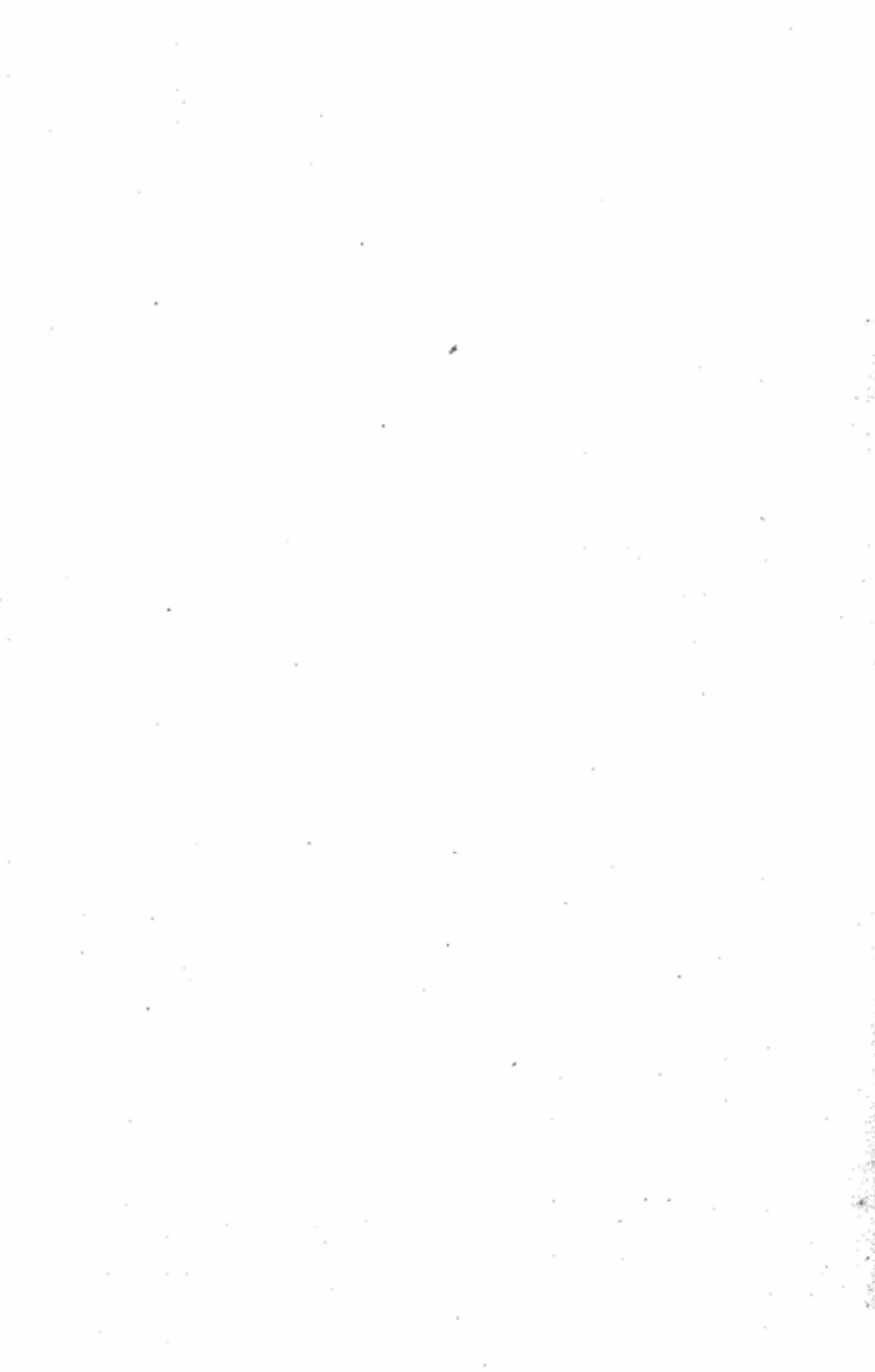
	°
Mean Max. Solar radiation Thermometer for the month ... ..	125.0

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	Inches.
Rained 8 days,—Max. fall of rain during 24 hours ... ..	1.00
Total amount of rain during the month ... ..	1.27
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	1.04
Prevailing direction of the Wind ... .. N. W., S. E & N. E.	

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level. 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahl.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.063	30.145	30.003	0.142	62.5	69.2	56.0	13.2
2	.042	.114	29.977	.137	63.1	72.6	54.5	18.1
3	.068	.140	30.026	.114	65.8	76.0	57.5	18.5
4	.068	.169	29.996	.173	66.2	78.0	56.0	22.0
5	.004	.079	.942	.137	68.9	81.3	58.0	23.3
6	29.986	.071	.930	.141	71.1	81.8	61.6	20.2
7	.976	.077	.909	.168	72.5	82.2	64.5	17.7
8	.953	.024	.902	.122	72.2	82.0	65.5	16.5
9	.949	.031	.886	.145	71.1	80.5	65.5	15.0
10	.938	.003	.901	.102	72.2	79.5	65.2	14.3
11	.992	.071	.938	.133	73.3	80.7	68.4	12.3
12	30.017	.106	.947	.150	71.1	80.0	63.3	16.7
13	29.973	.050	.900	.150	70.9	82.0	61.8	20.2
14	.951	.037	.893	.144	73.4	85.2	63.5	21.7
15	.938	.017	.860	.157	75.3	87.7	65.5	22.2
16	.899	29.971	.836	.135	75.5	88.0	66.9	21.1
17	.922	.988	.867	.121	71.1	80.0	63.5	16.5
18	.979	30.082	.917	.145	69.9	78.5	61.8	16.7
19	.963	.044	.914	.130	70.8	80.0	62.5	17.5
20	.986	.055	.929	.126	72.2	82.5	62.5	20.0
21	.976	.064	.917	.147	73.3	84.4	63.5	20.9
22	.932	.004	.867	.137	75.6	86.2	65.0	21.2
23	.897	29.963	.847	.116	77.2	88.7	68.5	20.2
24	.882	.945	.833	.112	78.5	88.8	70.0	18.8
25	.933	30.007	.890	.117	78.5	87.8	70.7	17.1
26	.962	.047	.910	.137	75.4	84.8	66.8	18.0
27	.907	29.996	.825	.171	74.1	85.5	64.5	21.0
28	.854	.940	.796	.144	74.6	86.5	65.3	21.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	56.8	5.7	51.7	10.8	0.396	4.42	1.93	0.70
2	57.5	5.6	52.5	10.6	.407	.54	.93	.70
3	58.6	7.2	52.8	13.0	.411	.56	2.48	.65
4	58.9	7.3	53.1	13.1	.415	.61	.51	.65
5	61.6	7.3	55.8	13.1	.455	5.02	.72	.65
6	63.9	7.2	58.1	13.0	.491	.39	.89	.65
7	65.7	6.8	60.3	12.2	.528	.79	.84	.67
8	65.7	6.5	60.5	11.7	.532	.83	.72	.68
9	65.8	5.3	61.6	9.5	.552	6.05	.23	.73
10	68.5	3.7	65.5	6.7	.628	.88	1.67	.81
11	65.5	7.8	59.3	14.0	.511	5.58	3.26	.63
12	63.2	7.9	56.9	14.2	.472	.17	.11	.62
13	62.1	8.8	55.1	15.8	.444	4.88	.35	.59
14	65.0	8.4	58.3	15.1	.494	5.39	.48	.61
15	65.9	9.4	59.3	16.0	.511	.56	.84	.59
16	66.0	9.5	59.3	16.2	.511	.56	.90	.59
17	61.3	9.8	53.5	17.6	.421	4.62	.66	.56
18	61.6	8.3	55.0	14.9	.442	.87	.11	.61
19	63.2	7.6	57.1	13.7	.475	5.21	2.99	.64
20	63.9	8.3	57.3	14.9	.478	.23	3.32	.61
21	65.2	8.1	58.7	14.6	.501	.47	.37	.62
22	67.6	8.0	62.0	13.6	.559	6.08	.40	.64
23	69.3	7.9	63.8	13.4	.593	.44	.51	.65
24	69.4	9.1	63.0	15.5	.578	.24	4.11	.60
25	68.7	9.8	61.8	16.7	.555	.00	.35	.58
26	64.0	11.4	56.0	19.4	.458	4.98	.45	.53
27	62.5	11.6	54.4	19.7	.434	.72	.35	.52
28	64.4	10.2	57.3	17.3	.478	5.21	3.99	.57

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.968	30.073	29.859	0.214	67.7	74.5	60.0	14.5
1	.961	.070	.849	.221	66.9	74.0	59.2	14.8
2	.954	.068	.838	.230	66.2	73.5	58.0	15.5
3	.944	.067	.824	.243	65.5	73.0	57.0	16.0
4	.942	.062	.835	.227	64.9	72.2	56.2	16.0
5	.955	.077	.853	.224	64.4	71.5	55.5	16.0
6	.973	.098	.873	.225	63.8	70.7	54.5	16.2
7	.991	.112	.887	.225	63.6	71.0	54.5	16.5
8	30.013	.130	.908	.222	65.6	73.5	55.5	18.0
9	.034	.156	.933	.223	70.0	78.5	59.5	19.0
10	.043	.169	.940	.220	73.8	81.5	62.0	19.5
11	.030	.144	.931	.213	76.6	84.0	64.2	19.8
Noon.	.002	.114	.898	.216	78.8	85.0	66.4	18.6
1	29.970	.080	.866	.214	80.2	87.2	67.5	19.7
2	.939	.052	.830	.222	81.3	88.3	68.6	19.7
3	.920	.042	.803	.239	82.0	88.8	69.2	19.6
4	.910	.035	.802	.233	81.7	88.8	68.8	20.0
5	.911	.043	.796	.247	80.5	88.0	68.5	19.5
6	.916	.048	.796	.252	77.5	84.0	66.2	17.8
7	.929	.062	.804	.258	74.6	81.0	64.0	17.0
8	.946	.084	.819	.265	72.7	79.5	63.0	16.5
9	.961	.091	.841	.250	71.2	78.0	62.3	15.7
10	.969	.094	.850	.244	69.9	76.0	61.5	14.5
11	.969	.093	.853	.240	68.8	75.0	61.0	14.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	63.1	4.6	59.4	8.3	0.513	5.67	1.79	0.76
1	62.6	4.3	59.2	7.7	.509	.64	.64	.78
2	62.1	4.1	58.8	7.4	.503	.57	.55	.78
3	61.7	3.8	58.7	6.8	.501	.56	.42	.80
4	61.3	3.6	58.4	6.5	.496	.50	.35	.80
5	61.0	3.4	57.9	6.5	.488	.41	.33	.80
6	60.7	3.1	57.9	5.9	.488	.42	.19	.82
7	60.5	3.1	57.7	5.9	.485	.39	.18	.82
8	61.3	3.3	57.9	7.7	.488	.40	.60	.77
9	62.8	7.2	57.0	13.0	.473	.20	2.80	.65
10	63.9	9.9	57.0	16.8	.473	.16	3.82	.58
11	64.9	11.7	56.7	19.9	.469	.08	4.69	.52
Noon.	65.5	13.3	56.2	22.6	.461	4.97	5.47	.48
1	66.1	14.1	56.2	24.0	.461	.96	.92	.46
2	66.3	15.0	55.8	25.5	.455	.89	3.35	.44
3	66.6	15.4	55.8	26.2	.455	.89	.58	.43
4	66.4	15.3	55.7	26.0	.453	.87	.50	.43
5	66.2	14.3	56.2	24.3	.461	.96	.02	.45
6	67.1	10.4	59.8	17.7	.520	5.62	4.42	.56
7	66.3	8.3	60.5	14.1	.532	.80	3.40	.63
8	65.7	7.0	60.1	12.6	.525	.74	2.94	.66
9	65.0	6.2	60.0	11.2	.523	.74	.56	.69
10	64.6	5.3	60.4	9.5	.530	.83	.15	.73
11	63.9	4.9	60.0	8.8	.523	.76	1.95	.75

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
1	119.0	...	N,NW&WNW	0.1	90.6	B.
2	118.0	...	N W & N by E	...	126.0	B. to 4 p. m., \i to 6 p. m. B to 11 p. m.
3	122.0	...	N by E & N W	...	73.1	B Slightly foggy at 8 p. m.
4	131.0	...	N W & N N W	...	40.1	B to 6 a. m., \i to 7 p. m. B to 11 p. m. Foggy from 8 to 11 p. m.
5	124.0	...	N N W & N by E	...	17.3	B to 4 a. m., \i to 4 p. m. B to 11 p. m. Foggy at midnight from 5 to 7 a. m. & 7 to 11 p. m.
6	126.0	...	N N W	...	47.8	B to 4 p. m., \i to 6 p. m. B to 11 p. m. Slightly foggy at midnight & 1 a. m. & from 8 to 11 p. m.
7	133.0	...	N N W & S E	...	28.2	B to 5 a. m., \i to 8 a. m. B to 11 p. m. Slightly foggy at midnight.
8	127.5	...	S E & N N E	...	22.0	B to 3 a. m., \i to 9 p. m. B to 11 p. m. Sheet L on N at 8 p. m. D at 9 p. m.
9	126.0	...	N by E & S by W	...	68.3	B to 3 a. m., S to 7 a. m. \i to 2 p. m., \i to 6 p. m. B to 11 p. m. D at 10½ a. m.
10	122.5	...	S by W & S W	...	36.7	B to 4 a. m., \i to 10 a. m., \i to 4 p. m., \i to 6 p. m., \i to 8 p. m. B to 11 p. m.
11	125.5	...	S W & N E	...	62.5	Chiefly B. D at 2½ a. m.
12	123.8	...	N E & W N W	...	19.1	B. to 7 a. m., \i to 11 p. m. Slightly foggy at 9 & 10 p. m.
13	127.0	...	N W & N N W	...	22.2	\i to 11 a. m., B to 1 p. m., \i to 11 p. m. Foggy from 7 to 11 p. m.
14	130.4	...	W N W	...	4.9	\i to 1 a. m. B to 11 p. m. Slightly foggy at 9 p. m.
15	132.6	...	S W & S	...	9.3	B to Noon, \i to 11 p. m.
16	135.0	...	SSW, SW & WSW	...	43.9	\i to Noon, B to 11 p. m.
17	127.0	...	N N E & N	...	132.1	B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of February 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<i>o</i>	Inches		lb	Mies.	
18	123.3	...	N & NE	...	62.4	B to 8 P. M., \i to 11 P. M.
19	122.7	...	NW, NE & ENE	...	22.4	Slightly foggy from 9 to 11 P. M. \i to 1 A. M. B to 11 P. M.
20	127.5	...	E NE & E by N	...	14.4	Foggy at midnight & 1 A. M. & 8 to 11 P. M.
21	131.5	...	E NE	...	15.8	B. Slightly foggy from mid- night to 2 A. M. & 9 to 11 P. M.
22	133.5	...	E NE & SW	...	12.8	B.
23	132.5	...	[by N SW, WSW & W	...	8.0	B to 7 A. M., \i to 11 P. M.
24	133.0	...	W	...	13.8	\i to 1 A. M., \i to 6 A. M. B to 2 P. M., \i to 5 P. M., \i to 11 P. M.
25	131.4	...	W	...	54.6	\i to 2 A. M. B to 2 P. M. \i to 4 P. M. B to 11 P. M.
26	130.0	...	W & WNW	...	30.6	B
27	131.8	...	WbyS, W & WbyN	...	18.7	B
28	135.0	...	WSW & W	...	39.5	B

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.965
Max. height of the Barometer occurred at 10 A. M. on the 4th ... ..	30.169
Min. height of the Barometer occurred at 5 & 6 P. M. on the 28th ... ..	29.796
Extreme range of the Barometer during the month ... ..	0.373
Mean of the daily Max. Pressures ... ..	30.044
Ditto ditto Min. ditto ... ..	29.906
Mean daily range of the Barometer during the month ... ..	0.138

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	°
Mean Dry Bulb Thermometer for the month ... ..	72.0
Max. Temperature occurred at 3 & 4 P. M. on the 24th ... ..	88.8
Min. Temperature occurred at 6 & 7 A. M. on the 2nd ... ..	51.5
Extreme range of the Temperature during the month ... ..	34.3
Mean of the daily Max. Temperature ... ..	82.2
Ditto ditto Min. ditto, ... ..	63.5
Mean daily range of the Temperature during the month ... ..	18.7

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Mean Wet Bulb Thermometer for the month ... ..	64.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	8.0
Computed Mean Dew-point for the month ... ..	57.6
Mean Dry Bulb Thermometer above computed mean Dew-point	14.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.483

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.29
Additional Weight of Vapour required for complete saturation ... ..	3.21
Mean degree of humidity for the month, complete saturation being unity	0.62

	°
Mean Max. Solar radiation Thermometer for the month ... ..	127.9

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	Inches.
Drizzled 3 days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... E. N. E. N. N. W. & N. W.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at $32^{\circ}$ Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.867	29.927	29.822	0.105	76.1	88.2	67.7	20.5
2	.899	.973	.847	.126	77.7	87.4	71.3	16.1
3	.912	.997	.842	.155	78.1	88.0	71.5	16.5
4	.926	30.003	.870	.133	78.9	89.0	71.5	17.5
5	.966	.044	.909	.135	79.4	91.0	71.3	19.7
6	.930	.013	.856	.157	80.1	92.0	73.0	19.0
7	.840	29.921	.762	.159	81.5	94.0	73.0	21.0
8	.797	.884	.754	.150	81.9	92.5	73.9	18.6
9	.786	.856	.728	.128	81.2	94.5	70.0	24.5
10	.757	.833	.685	.148	81.8	91.6	75.5	16.1
11	.724	.790	.642	.148	82.4	93.5	74.5	19.0
12	.722	.780	.668	.112	82.3	91.5	77.0	14.5
13	.713	.767	.653	.114	82.7	91.0	77.0	14.0
14	.771	.835	.701	.134	83.0	92.7	77.4	15.3
15	.787	.880	.705	.175	82.9	91.8	77.5	14.3
16	.784	.844	.733	.111	83.0	90.5	78.5	12.0
17	.813	.871	.762	.109	82.7	92.5	76.2	16.3
18	.808	.866	.751	.115	82.2	90.3	76.5	13.8
19	.842	.919	.784	.135	82.8	93.0	75.7	17.3
20	.850	.933	.772	.161	83.2	92.5	74.5	18.0
21	.848	.928	.770	.158	84.0	93.5	77.0	16.5
22	.834	.921	.731	.190	82.3	92.9	75.7	17.2
23	.808	.878	.705	.173	81.5	92.3	73.5	18.8
24	.809	.875	.738	.137	80.4	91.0	73.5	17.5
25	.789	.857	.722	.135	82.3	92.0	75.5	16.5
26	.766	.820	.662	.158	81.4	90.5	72.9	17.6
27	.809	.869	.750	.119	81.5	90.5	73.0	17.5
28	.836	.922	.734	.188	82.9	92.3	76.5	15.8
29	.838	.902	.777	.125	83.3	92.3	76.0	16.3
30	.818	.882	.747	.135	84.0	93.2	77.3	15.9
31	.801	.874	.722	.152	84.7	96.5	76.0	20.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	68.9	7.2	63.9	12.2	0.595	6.47	3.16	0.67
2	73.4	4.3	70.4	7.3	.736	7.99	2.11	.79
3	73.4	4.7	70.1	8.0	.729	.90	.32	.77
4	74.0	4.9	70.6	8.3	.741	8.02	.45	.77
5	72.1	7.3	67.0	12.4	.659	7.12	3.50	.67
6	72.1	8.0	66.5	13.6	.648	6.99	.85	.65
7	74.1	7.4	68.9	12.6	.701	7.54	.77	.67
8	69.8	12.1	61.3	20.6	.546	5.86	5.58	.51
9	69.9	11.3	62.0	19.2	.559	6.01	.20	.54
10	74.8	7.0	69.9	11.9	.725	7.79	3.61	.68
11	73.3	9.1	66.9	15.5	.657	.05	4.56	.61
12	74.7	7.6	69.4	12.9	.713	.66	3.92	.66
13	77.7	5.0	74.2	8.5	.832	8.93	2.79	.76
14	77.6	5.4	73.8	9.2	.822	.82	3.00	.75
15	77.6	5.3	73.9	9.0	.824	.85	2.94	.75
16	77.6	5.4	73.8	9.2	.822	.82	3.00	.75
17	77.4	5.3	73.7	9.0	.819	.80	2.92	.75
18	77.2	5.0	73.7	8.5	.819	.80	.74	.76
19	77.8	5.0	74.3	8.5	.835	.96	.79	.76
20	76.9	6.3	72.5	10.7	.787	.44	3.45	.71
21	77.8	6.2	73.5	10.5	.814	.70	.47	.72
22	75.0	7.3	69.9	12.4	.725	7.79	.79	.67
23	74.3	7.2	69.3	12.2	.711	.64	.67	.68
24	74.2	6.2	69.9	10.5	.725	.80	.14	.71
25	76.8	5.5	72.9	9.4	.797	8.57	.01	.74
26	75.7	5.7	71.7	9.7	.768	.26	.01	.73
27	76.2	5.3	72.5	9.0	.787	.47	2.84	.75
28	77.7	5.2	74.1	8.8	.830	.91	.88	.76
29	77.4	5.9	73.3	10.0	.809	.66	3.27	.73
30	77.9	6.1	73.6	10.4	.817	.75	.42	.72
31	77.6	7.1	72.6	12.1	.790	.45	.97	.68

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.831	29.984	29.730	0.254	77.0	80.0	69.6	10.4
1	.820	.971	.713	.258	76.6	79.8	69.2	10.6
2	.808	.948	.701	.247	76.3	80.0	69.0	11.0
3	.796	.928	.690	.238	76.0	80.0	68.7	11.3
4	.796	.930	.679	.251	75.6	80.0	68.0	12.0
5	.810	.947	.687	.260	75.3	79.3	67.7	11.6
6	.828	.961	.707	.254	75.0	78.5	67.7	10.8
7	.851	.993	.718	.275	75.1	78.5	67.8	10.7
8	.873	30.012	.736	.276	76.9	80.5	69.5	11.0
9	.889	.037	.763	.274	80.3	84.6	73.0	11.6
10	.889	.044	.767	.277	83.4	87.5	76.8	10.7
11	.877	.024	.756	.268	86.6	92.0	80.0	12.0
Noon.	.852	.002	.733	.269	88.6	93.5	82.6	10.9
1	.821	29.971	.701	.270	90.2	95.2	84.0	11.2
2	.790	.946	.674	.272	91.3	96.5	86.0	10.5
3	.767	.925	.658	.267	91.6	96.5	87.4	9.1
4	.756	.917	.647	.270	90.9	96.0	86.0	10.0
5	.757	.909	.642	.267	88.9	93.3	84.5	8.8
6	.767	.924	.647	.277	85.8	89.5	82.0	7.5
7	.793	.944	.687	.257	82.9	87.2	77.4	9.8
8	.817	.970	.711	.259	80.5	83.9	74.0	9.9
9	.835	.987	.737	.250	79.3	82.3	73.9	8.4
10	.842	.992	.747	.245	78.4	81.2	73.0	8.2
11	.839	.998	.747	.251	77.8	81.0	72.9	8.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	74.1	2.9	72.1	4.9	0.778	8.44	1.45	0.85
1	74.0	2.6	72.2	4.4	.781	.48	.29	.82
2	74.0	2.3	72.4	3.9	.785	.53	.16	.88
3	73.8	2.2	72.3	3.7	.783	.51	.09	.89
4	73.7	1.9	72.4	3.2	.785	.55	0.93	.90
5	73.5	1.8	72.2	3.1	.781	.50	.90	.90
6	73.3	1.7	72.1	2.9	.778	.48	.83	.91
7	73.5	1.6	72.4	2.7	.785	.55	.79	.92
8	74.7	2.2	73.2	3.7	.806	.75	1.11	.89
9	75.8	4.5	72.6	7.7	.790	.52	2.39	.78
10	76.4	7.0	71.5	11.9	.763	.18	3.78	.68
11	77.0	9.6	71.2	15.4	.756	.05	5.09	.61
Noon.	76.9	11.7	69.9	18.7	.725	7.68	6.24	.55
1	77.1	13.1	69.2	21.0	.708	.48	7.11	.51
2	77.0	14.3	68.4	22.9	.690	.27	.79	.48
3	77.0	14.6	68.2	23.4	.686	.23	.98	.48
4	76.6	14.3	68.0	22.9	.681	.18	.71	.48
5	76.5	12.4	69.1	19.8	.706	.47	6.57	.53
6	76.1	9.7	69.3	16.5	.711	.56	5.27	.59
7	75.4	7.5	70.1	12.8	.729	.82	3.97	.66
8	74.6	5.9	70.5	10.0	.739	.97	.01	.73
9	74.6	4.7	71.3	8.0	.758	8.20	2.39	.77
10	74.6	3.8	71.9	6.5	.773	.36	1.95	.81
11	74.5	3.3	72.2	5.6	.781	.45	.68	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
1	135.2	...	W S W	...	58.2	B to 5, S to 9 A.M. B to 1, ̂i to 3, B to 11 P. M. Foggy from 6 to 8 A. M.
2	139.0	...	W S W, & S W	1.0	78.8	B to 2, S to 8 A.M., ̂i to 7, B to 11 P. M. Foggy from 3 to 8 A.M.
3	135.6	...	S W & W S W	...	34.1	B to 3, S to 9 A. M., ̂i to 5, B to 11 P. M. Foggy from 4 to 9 A.M.
4	137.0	...	W S W & S W	...	66.5	B to 3, ̂i to 5, B to 8 A. M., ̂i to 5, B to 11 P. M.
5	140.0	...	S W	...	60.1	B to 5, ̂i to 8 A. M. B to 11 P. M. Foggy at 6 & 7 A. M.
6	142.0	...	S W & W S W	...	94.4	B.
7	140.0	...	S W & S S W	0.2	116.5	B to 6, ̂i to 8 A. M. B to 3, ̂i to 6, ̂i to 9, B to 11 P. M. D at 6 P. M.
8	135.0	...	SSW, NW & S W	0.6	59.4	B to 2, ̂i to 7 A.M. B to 11 P.M.
9	137.4	...	S W & N by W	0.2	71.7	B. Slightly foggy at 6 & 7 A.M.
10	134.0	...	S	...	150.8	B to 5, ̂i to 11 A. M. B to 9, ̂i to 11 P. M.
11	138.0	...	S, & W by S	0.7	89.3	̂i to 1, S to 8 A.M. B to 11 P.M.
12	137.0	...	W by S & S	...	86.7	S to 7 A.M., ̂i to 2, B to 11 P.M.
13	136.0	...	S by E & S	...	132.5	S to 4, O to 6 A. M. ̂i to 1, B to 8, scuds to 11 P. M.
14	136.6	...	S, S S E & S by E	...	195.4	B to 4, O to 7, ̂i to 9 A. M. B to 2, ̂i to 5, B to 11 P. M.
15	136.0	...	S by E & S	...	152.3	B to 3, S to 9, ̂i to 11 A. M. ̂i to 4, B to 11 P. M.
16	135.0	...	S & S S E	...	150.0	B to 1, S to 8, ̂i to 11 A. M., ̂i to 1, B to 11 P. M.
17	13.0	...	S S E, S & S by E	...	151.3	B to 5, ̂i to 8, B to 11 P. M.
18	132.0	...	S by E, S W, S & W	1.2	223.6	B to 11 A. M., ̂i to 3, O to 9, B to 11 P. M. T & L. from 5½ to 8 P. M. D between 7 & 8 P. M.
19	138.9	...	W, S & S by W	...	190.8	Clouds of different kinds.
20	13.5	...	S by W & S	...	89.2	B to 9 A. M., ̂i to 7, B to 11 P. M. Foggy at 5 & 6 A. M.
21	138.0	...	S	0.8	73.7	B to 4, O to 7, B to 10 A. M., ̂i to 7, B to 11 P. M.

̂i Cirri, —i Strati, ̂i Cumuli, ̂i Cirro-strati, ̂i Cumulo-strati, ̂i Nimbi,  
̂i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of March 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
22	139.0	...	S S E & S E	...	76.7	Chiefly B.
23	139.5	...	E by S & S E	2.0	106.5	B to 2, \i to 6, B to 8 A. M., \i to 8, B to 11 P. M. T & L between 7 & 8 P. M. D at 6½ P. M.
24	135.5	...	S E & S by E	1.3	143.1	B to 6, \i to 11 A. M., \i to 3, O to 5, S to 9, B to 11 P. M. T between 4 & 5 P. M. Sheet L from 6½ to 9 P. M.
25	138.5	...	S E & S by E	...	179.5	B to 7 A. M., \i to 4, S to 11 P. M. Sheet L on N E at 6½ P. M.
26	133.0	...	S by E, SSW & S E	4.8	210.8	S to 1, \i to 6, S to 9 A. M. B to 1, \i to 11 P. M. Brisk wind from 9½ A. M. to 8 P. M. Sheet L on E at 8 P. M. D at 7 P. M.
27	137.0	...	S E & S by E	...	216.6	B to 2, S to 9 A. M., \i to 2, \i to 5, S to 11 P. M.
28	131.3	...	S by E	...	107.0	B to 5 A. M. S to 9, B to 11 P. M. L on N at P. M.
29	134.5	...	S by E & S	...	102.5	B to 5, \i to 8 A. M., \i to 3, S to 11 P. M.
30	131.0	...	S & S by E	...	61.5	\i to 6, S to 11 A. M. \i to 7, B to 11 P. M. Sheet L on N E between 6 & 7 P. M.
31	133.0	...	S by E & S	...	80.5	B to 9 A. M., \i to 3. S to 6. B to 11 P. M. T at 6 P. M. L on N between 6 & 7 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.821
Max. height of the Barometer occurred at 10 A. M. on the 5th ...	30.044
Min. height of the Barometer occurred at 5 P. M. on the 11th ...	29.642
Extreme range of the Barometer during the month ... ..	0.402
Mean of the daily Max. Pressures ... ..	29.892
Ditto ditto Min. ditto ... ..	29.751
Mean daily range of the Barometer during the month ... ..	0.141

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	°
Mean Dry Bulb Thermometer for the month ... ..	81.7
Max. Temperature occurred at 2 & 3 P. M. on the 31st ... ..	96.5
Min. Temperature occurred at 5 & 6 A. M. on the 1st ... ..	67.7
Extreme range of the Temperature during the month ... ..	28.8
Mean of the daily Max. Temperature ... ..	91.8
Ditto ditto Min. ditto, ... ..	74.5
Mean daily range of the Temperature during the month ... ..	17.3

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Mean Wet Bulb Thermometer for the month ... ..	75.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.5
Computed Mean Dew-point for the month ... ..	70.6
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	11.1

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.741

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	Troy grain.
Mean Weight of Vapour for the month ... ..	7.97
Additional Weight of Vapour required for complete saturation ...	3.40
Mean degree of humidity for the month, complete saturation being unity	0.70

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.4

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	Inches.
Drizzled 4 days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... .. S. by E., S. & S. W.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.793	29.861	29.713	0.148	83.6	93.0	77.0	16.0
2	.802	.861	.735	.126	83.3	91.5	76.7	14.8
3	.818	.884	.766	.118	83.0	92.5	75.0	17.5
4	.824	.912	.753	.159	84.2	94.6	77.0	17.6
5	.802	.872	.700	.172	84.9	93.8	78.5	15.3
6	.767	.837	.705	.132	83.1	92.8	74.0	18.8
7	.710	.772	.628	.144	86.0	96.0	78.2	17.8
8	.689	.768	.615	.153	87.2	100.0	77.8	22.2
9	.672	.744	.604	.140	87.5	100.0	78.5	21.5
10	.672	.743	.597	.146	88.2	102.0	79.0	23.0
11	.696	.776	.622	.154	88.1	100.0	80.5	19.5
12	.684	.760	.607	.153	87.9	99.0	81.0	18.0
13	.673	.739	.603	.136	87.8	98.4	80.3	18.1
14	.703	.775	.640	.135	87.8	99.4	80.0	19.4
15	.719	.798	.660	.138	87.7	98.8	80.0	18.8
16	.706	.815	.608	.207	88.5	101.5	80.0	21.5
17	.671	.762	.588	.174	89.4	102.5	80.5	22.0
18	.685	.745	.623	.122	89.1	102.2	81.3	20.9
19	.756	.829	.690	.139	88.1	99.7	80.0	19.7
20	.773	.844	.712	.132	84.8	91.8	81.5	10.3
21	.733	.796	.659	.137	85.3	93.0	80.0	13.0
22	.749	.814	.666	.148	83.1	90.0	76.0	14.6
23	.716	.782	.648	.134	81.2	92.0	73.3	18.7
24	.626	.705	.530	.175	84.3	93.8	76.0	17.8
25	.579	.635	.488	.147	84.5	95.7	75.0	20.7
26	.593	.641	.535	.106	81.1	92.5	74.5	18.0
27	.623	.686	.568	.118	78.6	88.2	73.6	14.6
28	.639	.705	.581	.124	80.5	88.9	73.9	15.0
29	.635	.692	.572	.120	85.7	93.0	80.5	12.5
30	.650	.720	.588	.132	86.2	91.6	82.8	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.3	5.3	74.6	9.0	0.843	9.03	3.00	0.75
2	77.6	5.7	73.6	9.7	.817	8.75	.18	.73
3	78.0	5.0	74.5	8.5	.840	9.01	2.81	.76
4	78.1	6.1	73.8	10.4	.822	8.80	3.44	.72
5	78.7	6.2	74.4	10.5	.838	.95	.54	.72
6	75.7	7.4	70.5	12.6	.739	7.92	.94	.67
7	78.6	7.4	73.4	12.6	.811	8.64	4.27	.67
8	78.1	9.1	72.6	14.6	.790	.40	.97	.63
9	79.3	8.2	74.4	13.1	.838	.91	.58	.66
10	79.0	9.2	73.5	14.7	.814	.63	5.13	.63
11	80.9	7.2	76.6	11.5	.899	9.54	4.18	.70
12	81.2	6.7	77.2	10.7	.916	.73	3.91	.71
13	81.0	6.8	76.9	10.9	.908	.64	.96	.71
14	81.5	6.3	77.7	10.1	.931	.90	.70	.73
15	81.1	6.6	77.1	10.6	.913	.70	.86	.72
16	79.6	8.9	74.3	14.2	.835	8.86	5.02	.64
17	78.2	11.2	71.5	17.9	.763	.08	6.17	.57
18	79.8	9.3	74.2	14.9	.832	.82	5.30	.63
19	78.6	9.5	72.9	15.2	.797	.47	.25	.62
20	79.8	5.0	76.3	8.5	.890	9.52	2.94	.76
21	79.4	5.9	75.3	10.0	.862	.21	3.43	.73
22	76.6	6.5	72.0	11.1	.776	8.31	.55	.70
23	72.9	8.3	67.1	14.1	.661	7.12	4.09	.64
24	74.8	9.5	68.1	16.2	.684	.31	.97	.60
25	77.2	7.3	72.1	12.4	.778	8.33	.02	.67
26	75.0	6.1	70.7	10.4	.744	.02	3.15	.72
27	75.4	3.2	73.2	5.4	.806	.73	1.65	.84
28	76.9	3.6	74.4	6.1	.838	9.04	.94	.82
29	81.3	4.4	78.2	7.5	.946	10.09	2.71	.79
30	81.3	4.9	77.9	8.3	.937	.00	.99	.77

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.716	29.851	29.602	0.249	80.7	83.7	74.5	9.2
1	.704	.840	.572	.268	80.1	83.0	74.5	8.5
2	.694	.825	.566	.259	79.7	83.3	74.2	9.1
3	.685	.813	.559	.254	79.3	83.5	73.7	9.8
4	.686	.804	.560	.244	78.9	83.5	73.5	10.0
5	.701	.807	.586	.221	78.7	83.5	73.4	10.1
6	.718	.824	.594	.230	78.5	83.2	73.3	9.9
7	.739	.849	.609	.240	79.4	83.8	74.0	9.8
8	.761	.892	.622	.270	81.9	85.7	76.3	9.4
9	.772	.912	.633	.279	85.2	88.5	77.5	11.0
10	.771	.911	.630	.281	88.2	92.0	80.0	12.0
11	.760	.899	.615	.284	91.0	96.2	81.0	15.2
Noon.	.739	.873	.602	.271	93.0	98.8	83.6	15.2
1	.709	.830	.567	.263	93.9	100.6	80.5	20.1
2	.681	.800	.542	.258	94.5	101.9	83.0	18.9
3	.658	.776	.516	.260	94.8	102.5	84.4	18.1
4	.641	.771	.488	.283	94.4	102.5	85.0	17.5
5	.637	.766	.515	.251	92.2	101.2	81.0	20.2
6	.647	.772	.530	.242	88.8	96.9	74.5	22.4
7	.668	.808	.555	.253	86.1	90.3	74.5	15.8
8	.689	.824	.565	.259	83.9	87.4	75.0	12.4
9	.712	.835	.591	.244	82.7	85.5	75.5	10.0
10	.720	.861	.589	.272	81.7	84.5	75.5	9.0
11	.720	.855	.602	.253	81.3	84.0	75.2	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.6	3.1	75.4	5.3	0.865	9.34	1.70	0.85
1	77.2	2.9	75.2	4.9	.860	.28	.56	.86
2	76.9	2.8	74.9	4.8	.851	.19	.53	.86
3	76.7	2.6	74.9	4.4	.851	.21	.38	.87
4	76.6	2.3	75.0	3.9	.854	.24	.23	.88
5	76.5	2.2	75.0	3.7	.854	.24	.17	.89
6	76.5	2.0	75.1	3.4	.857	.28	.07	.90
7	77.1	2.3	75.5	3.9	.868	.38	.24	.88
8	78.3	3.6	75.8	6.1	.876	.43	3.01	.82
9	79.4	5.8	75.3	9.9	.862	.21	.40	.73
10	79.8	8.4	74.8	13.4	.849	.02	4.74	.66
11	80.0	11.0	73.4	17.6	.811	8.55	6.38	.57
Noon.	79.5	13.5	71.4	21.6	.761	7.98	7.83	.51
1	80.0	13.9	71.7	22.2	.768	8.06	8.16	.50
2	79.6	14.9	70.7	23.8	.744	7.79	.72	.47
3	79.9	14.9	71.0	23.8	.751	.85	.80	.47
4	80.4	14.0	72.0	22.4	.776	8.13	.33	.49
5	79.5	12.7	71.9	20.3	.773	.14	7.31	.53
6	79.5	9.3	73.9	14.9	.284	.74	5.26	.62
7	79.4	6.7	74.7	11.4	.846	9.03	3.92	.70
8	78.7	5.2	75.1	8.8	.857	.17	2.96	.76
9	78.3	4.4	75.2	7.5	.860	.22	.50	.78
10	77.9	3.8	75.2	6.5	.860	.24	.13	.81
11	77.8	3.5	75.3	6.0	.862	.20	1.95	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	134.0	...	S & S by E	...	122.6	B to 4 A.M., \i to 6, B to 11 P.M.
2	133.0	...	E S E & S	0.8	217.9	S to 5 A.M., \i to 2, \i to 5, S to 11 P.M. T at 11 P.M. L on N W from 9 to 11 P.M.
3	134.2	1.03	S E & S S E	...	188.7	\i to 1, B to 5, \i to 8 A.M. \i to 7, S to 11 P.M. T L & R before midnight.
4	136.0	...	S S E & S by E	0.2	145.6	\i to 1, B to Noon, \i to 4, S to 8, \i to 11 P.M. Sheet L on N W at 7 & 8 P.M. D at 8 P.M.
5	134.2	...	S S E & S	...	145.0	Scuds to 3, \i to 6, \i to 10, B to Noon, \i to 4, S to 9 B to 11 P.M. T & L from 5½ to 9 P.M., D at 9 P.M.
6	133.0	...	S by W & S	...	100.4	B to 1, \i to 4, O to 6, \i to 9 A.M., \i to 5, B to 11 P.M. T, L & D at 5½ A.M.
7	140.8	...	S	...	164.5	Scuds to 8, B to 11 A.M., \i to 3, B to 11 P.M.
8	144.0	...	S	...	147.1	B.
9	143.0	...	S	...	141.9	B.
10	146.0	...	S & S S E	...	166.5	B.
11	145.0	...	S by E & S	...	174.2	B.
12	143.3	...	S & S by E	...	169.5	B to 1. Scuds to 8 A.M. B to 9, Scuds to 11 P.M.
13	145.8	...	S	...	210.0	B to 2, Scuds to 7 A.M. B to 11 P.M.
14	145.0	...	S	...	223.6	Scuds to 7 A.M. B to 11 P.M.
15	145.2	...	S	...	198.0	B to 3, S to 6 A.M. B to 11 P.M.
16	145.5	...	S	...	191.9	B to 5, Scuds to 8 A.M. B to 9, Scuds to 11 P.M.
17	147.0	...	S	...	105.6	Scuds to 2 A.M. B to 1, \i to 4, B to 9, Scuds to 11 P.M.
18	146.2	...	S	1.0	160.7	Scuds to 3 A.M. B to 3, \i to 11 P.M.
19	143.0	...	S by W & S	...	147.3	\i to 1, \i to 10 A.M. B to 1, \i to 11 P.M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of April 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
20	125.0	...	S & S S E	...	163.5	¶i to 8 A. M. O to 2, ¶i & ¶i to 11 P. M.
21	132.0	...	S S E, S & S by E	...	153.7	¶i & ¶i to 7 A. M. S to 3, ¶i to 11 P. M.
22	129.0	...	S by E & S	...	93.3	¶i to 4 A. M. S to 7, O to 11 P. M. Sheet L at 8 P. M. D at 8½ P. M.
23	142.0	0.01	S E & E S E	...	155.3	S to 6, ¶i to 11 A. M., ¶i to 4, S to 6, ¶i & ¶i to 9, B to 11 P. M. Light R between 1 & 2 P. M.
24	138.5	...	E S E & S	...	69.7	B to 10 A. M., ¶i to 2, ¶i to 4, B to 11 P. M.
25	141.0	0.24	S E & S	...	126.5	B to 7 A. M., ¶i to 3, S to 5 O to 9, S to 11 P. M. T at 7 & 8 P. M. L from 7 to 9 P. M. R at 7 & 8½ P. M.
26	139.5	2.53	S E	...	248.6	S to 4, B to 6, Scuds to 9 A. M. ¶i to 4, O to 11 P. M. T at 2½ P. M. T & L from 5½ to 10 P. M. Hail stone at 5½ P. M. R at 2½, 3½ & from 5½ to 10 P. M.
27	141.5	0.37	...	...	199.6	O to 3, ¶i to 6 A. M., ¶i to 4, O to 11 P. M. T from Noon to 2, at 5, 7½ & 9½ P. M. L from 7 to 9 P. M. R from 11½ A. M. to 1, at 5½ 10 & 11 P. M.
28	140.0	...	S	...	69.6	Clouds of different kinds. D at Midnight.
29	139.2	...	S & S S W	1.2	107.2	S to 11 A. M., ¶i to 3, Scuds to 11 P. M. Brisk wind from Noon to 6 & 9½ to 11 P. M. Sheet L on S W from 7½ to 10 P. M.
30	139.5	...	S S W & S	5.2	208.6	Scuds Brisk wind from 7½ A. M. to 11 P. M.

¶i Cirri,—i Strati, ¶i Cumuli, ¶i Cirro-strati, ¶i Cumulo-strati, ¶i Nimb, ¶i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.705
Max. height of the Barometer occurred at 9 A. M. on the 4th ...	29.912
Min. height of the Barometer occurred at 4 P. M. on the 25th ...	29.488
Extreme range of the Barometer during the month ... ..	0.424
Mean of the daily Max. Pressures ... ..	29.776
Ditto ditto Min. ditto ... ..	29.633
Mean daily range of the Barometer during the month ... ..	0.143

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	°
Mean Dry Bulb Thermometer for the month ... ..	85.4
Max. Temperature occurred at 3 & 4 P. M. on the 17th ... ..	102.5
Min. Temperature occurred at 6 A. M. on the 23rd ... ..	73.3
Extreme range of the Temperature during the month ... ..	29.2
Mean of the daily Max. Temperature ... ..	95.6
Ditto ditto Min. ditto, ... ..	78.1
Mean daily range of the Temperature during the month ... ..	17.5

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Mean Wet Bulb Thermometer for the month ... ..	78.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.9
Computed Mean Dew-point for the month ... ..	73.7
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	11.7

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.819

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	Troy grain.
Mean Weight of Vapour for the month ... ..	8.74
Additional Weight of Vapour required for complete saturation ...	3.94
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month ... ..	140.0

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	Inches.
Rained 10 days,—Max. fall of rain during 24 hours ... ..	2.53
Total amount of rain during the month ... ..	4.18
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	3.06
Prevailing direction of the Wind ... .. S.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.654	29.726	29.567	0.159	86.5	92.4	82.4	10.0
2	.731	.896	.643	.253	83.9	93.0	72.5	20.5
3	.804	.912	.702	.210	80.5	89.5	72.9	16.6
4	.755	.824	.660	.164	81.3	90.0	75.0	15.0
5	.704	.775	.611	.164	81.5	90.0	74.0	16.0
6	.692	.753	.622	.131	81.0	86.0	77.0	9.0
7	.676	.726	.616	.110	82.2	91.6	77.0	14.6
8	.633	.690	.551	.139	84.4	92.2	78.0	14.2
9	.609	.689	.519	.170	84.2	92.8	75.0	17.8
10	.613	.680	.522	.158	84.3	94.0	76.5	17.5
11	.617	.668	.548	.120	85.4	94.4	77.0	17.4
12	.653	.728	.573	.155	84.6	93.5	76.5	17.0
13	.719	.789	.667	.122	84.3	92.0	75.5	16.5
14	.755	.820	.676	.144	86.4	92.8	81.4	11.4
15	.685	.747	.601	.146	87.4	93.5	82.5	11.0
16	.663	.787	.578	.209	86.7	94.3	75.5	18.8
17	.739	.824	.654	.170	83.7	92.6	75.8	16.8
18	.792	.885	.728	.157	82.8	92.5	74.8	17.7
19	.811	.879	.738	.141	81.4	91.5	75.0	16.5
20	.771	.816	.687	.129	83.5	93.7	78.5	15.2
21	.780	.840	.696	.144	85.1	94.5	78.5	16.0
22	.794	.852	.707	.145	84.8	94.0	80.2	13.8
23	.770	.841	.676	.165	85.5	94.0	79.0	15.0
24	.704	.774	.593	.181	85.9	95.0	77.7	17.3
25	.658	.732	.555	.177	84.3	93.6	77.0	16.6
26	.634	.701	.565	.136	84.0	94.7	76.0	18.7
27	.651	.704	.608	.096	81.9	93.7	73.0	20.7
28	.674	.740	.597	.143	85.4	93.5	77.8	15.7
29	.653	.733	.561	.172	86.4	94.0	80.0	14.0
30	.638	.702	.555	.147	86.9	95.2	80.5	14.7
31	.608	.677	.531	.146	88.1	96.0	83.0	13.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.3	5.2	78.2	8.3	0.946	10.09	3.01	0.77
2	78.2	5.7	74.2	9.7	.832	8.91	.22	.74
3	73.9	6.6	69.3	11.2	.711	7.66	.32	.70
4	75.6	5.7	71.6	9.7	.766	8.23	.01	.73
5	75.3	6.2	71.0	10.5	.751	.07	.24	.71
6	76.4	4.6	73.2	7.8	.806	.68	2.46	.78
7	77.4	4.8	74.0	8.2	.827	.90	.64	.77
8	78.7	5.7	74.7	9.7	.846	9.05	3.26	.74
9	79.2	5.0	75.7	8.5	.873	.34	2.90	.76
10	78.7	5.6	74.8	9.5	.849	.07	3.21	.74
11	79.3	6.1	75.0	10.4	.854	.12	.56	.72
12	77.9	6.7	73.2	11.4	.806	8.63	.76	.70
13	79.4	4.9	76.0	8.3	.882	9.45	2.83	.77
14	81.1	5.3	77.4	9.0	.922	.83	3.23	.75
15	82.2	5.2	79.1	8.3	.973	10.36	.09	.77
16	80.8	5.9	77.3	9.4	.919	9.80	.38	.74
17	77.1	6.6	72.5	11.2	.787	8.44	.63	.70
18	76.8	6.0	72.6	10.2	.790	.49	.26	.72
19	75.5	5.9	71.4	10.0	.761	.18	.09	.73
20	78.3	5.2	74.7	8.8	.846	9.06	2.94	.76
21	78.6	6.5	74.0	11.1	.827	8.84	3.73	.70
22	78.9	5.9	74.8	10.0	.819	9.07	.39	.73
23	79.1	6.4	74.6	10.9	.843	.00	.72	.71
24	79.1	6.8	74.3	11.6	.835	8.90	.97	.69
25	78.6	5.7	74.6	9.7	.843	9.02	.26	.74
26	77.9	6.1	73.6	10.4	.817	8.75	.42	.72
27	76.6	5.3	72.9	9.0	.797	.57	2.87	.75
28	79.4	6.0	75.2	10.2	.860	9.18	3.50	.72
29	80.5	5.9	76.4	10.0	.893	.53	.53	.73
30	86.3	6.6	76.3	10.6	.890	.48	.77	.72
31	82.0	6.1	78.3	9.8	.949	10.07	.65	.73

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.708	29.862	29.573	0.289	79.4	83.9	72.9	11.0
1	.694	.836	.579	.257	79.3	83.5	74.7	8.8
2	.684	.797	.584	.213	79.3	84.0	74.5	9.5
3	.677	.778	.577	.201	79.0	84.0	74.5	9.5
4	.680	.815	.582	.233	78.7	83.5	73.0	10.5
5	.698	.863	.592	.271	78.6	83.0	74.0	9.0
6	.714	.896	.609	.287	78.8	83.0	74.5	8.5
7	.734	.912	.631	.281	80.1	84.3	74.5	9.8
8	.749	.881	.655	.226	82.7	86.5	74.5	12.0
9	.757	.879	.666	.213	85.6	89.3	77.5	11.8
10	.756	.873	.668	.205	88.0	91.4	81.0	10.4
11	.745	.861	.649	.212	89.4	92.8	78.5	14.3
Noon.	.728	.844	.636	.208	90.8	94.3	79.3	15.0
1	.701	.825	.594	.231	91.9	94.5	82.5	12.0
2	.673	.793	.565	.228	92.5	95.5	84.7	10.8
3	.649	.771	.551	.220	92.1	96.0	84.0	12.0
4	.626	.754	.528	.226	91.0	95.7	83.0	12.7
5	.619	.740	.519	.221	89.8	93.5	81.3	12.2
6	.636	.759	.544	.215	87.7	92.0	81.5	10.5
7	.664	.798	.566	.232	85.2	89.5	76.5	13.0
8	.695	.824	.582	.242	83.2	87.3	72.5	14.8
9	.712	.822	.601	.221	81.1	86.0	73.5	12.5
10	.724	.862	.616	.246	80.3	85.4	73.5	11.9
11	.723	.896	.603	.293	79.6	84.5	72.5	12.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	75.8	3.6	73.3	6.1	0.809	8.73	1.89	0.82
1	75.9	3.4	73.5	5.8	.814	.79	.80	.83
2	75.9	3.4	73.5	5.8	.814	.79	.80	.83
3	76.0	3.0	73.9	5.1	.824	.92	.58	.85
4	75.9	2.8	73.9	4.8	.824	.92	.49	.86
5	76.1	2.5	74.3	4.3	.835	9.05	.33	.87
6	76.4	2.4	74.7	4.1	.846	.16	.28	.88
7	77.5	2.6	75.7	4.4	.873	.43	.41	.87
8	78.9	3.8	76.2	6.5	.887	.52	2.20	.81
9	80.0	5.6	76.1	9.5	.885	.44	3.32	.74
10	80.9	7.1	76.6	11.4	.899	.56	4.12	.70
11	81.1	8.3	76.1	13.3	.885	.38	.87	.66
Noon.	81.5	9.3	75.9	14.9	.879	.28	5.56	.63
1	81.7	10.2	75.6	16.3	.871	.18	6.14	.60
2	81.9	10.6	75.5	17.0	.868	.14	.45	.59
3	81.2	10.9	74.7	17.4	.846	8.92	.49	.58
4	80.8	10.2	74.7	16.3	.846	.93	.00	.60
5	80.5	9.3	74.9	14.9	.851	9.00	5.42	.62
6	80.0	7.7	75.4	12.3	.865	.20	4.36	.68
7	79.1	6.1	74.8	10.4	.849	.07	3.54	.72
8	78.0	5.2	74.4	8.8	.838	8.99	2.90	.76
9	76.8	4.3	73.8	7.3	.822	.85	.32	.79
10	76.3	4.0	73.5	6.8	.814	.78	.13	.81
11	75.9	3.7	73.3	6.3	.809	.73	1.96	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	139.0	...	S & S S W	5.0	385.5	Chiefly scuds. High wind from 7½ A. M. to 7 P. M. D at 4½ P. M.
2	140.0	0.95	S S E & S	11.0	309.6	B to 1 A. M. Scuds to 6, O to 11 P. M. High wind from 2 to 7½ P. M. D at 2 A. M. T, L & R from 7 to 11 P. M.
3	136.5	0.38	Variable	3.0	203.3	O to 7, ̣i to 10 A. M., ̣i to 1, ̣i to 6, O to 11 P. M. Brisk wind from Midnight to 8 A. M. T at 8 & 9 P. M. L from 7 to 11 P. M. Slight R at midnight, 4½, 6, A. M. 5, 7 & 8 P. M.
4	138.5	0.16	E N E & Variable	2.0	149.4	O to 3, ̣i to 7, ̣i to 9 A. M. ̣i to 7, O to 11 P. M. L from 7 to 10 P. M. T at 9 P. M. R between 8 & 9 P. M.
5	138.0	...	Variable	...	72.3	O to 1, S to 4, ̣i to 11 A. M. ̣i to 6, S to 11 P. M. T. at 5½ & 6½ P. M. L at 6½, 9 & 10 P. M.
6	131.0	...	E & E S E	1.0	51.9	B to 4, ̣i to 6, S to 10, O to Noon, ̣i to 5, ̣i to 11 P. M. Sheet L on N at 4 A. M. T from 10 to Noon D at 11 & Noon.
7	140.0	...	E S E, E & S S E	1.2	53.2	B to 7 A. M., ̣i to 7, B to 11 P. M., T from 2½ to 4 P. M. D at 4½ P. M.
8	141.0	...	S S E & S by E	0.2	57.7	B to 6 A. M., ̣i to 3, ̣i to 5, B 11 P. M. Sheet L on N from 7½ to 10 P. M.
9	134.0	0.09	S S E & S	34.0	125.5	B to 6 A. M., ̣i to 5, S to 11 P. M. Strong wind from 7½ to 8½ P. M. L on N W at 10 P. M. Slight R between 7 & 8 P. M.
10	142.8	...	E & S S W	...	100.7	S to 6 A. M., ̣i to 4, B to 7, ̣i to 9 ̣i to 11 P. M. Sheet L from 8 to 11 P. M.
11	144.5	...	S & S S W	2.7	115.3	O to 3, S to 8 A. M., ̣i to 2, B to 7, ̣i to 11 P. M. D at 8½ P. M.

̣i Cirri, —i Strati, ̣i Cumuli, ̣i Cirro-strati, ̣i Cumulo-strati, ̣i Nimbi,  
̣i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of May 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
12	141.2	0.63	S & S W	14.0	175.0	O to 4, $\searrow$ i to 7 A. M., $\nearrow$ i to 6 O to 11 P. M. High wind from 3½ to 8 P. M. T & L between 7 & 8 P. M., R from 7½ to 9 P. M.
13	144.5	...	S E & S S W	...	174.1	O to 1, $\searrow$ i to 8 A. M., $\searrow$ i to 2, B to 11 P. M.
14	140.0	...	S & S S W	1.2	223.9	B to 5, $\searrow$ i to 8 A. M., $\searrow$ i to 4 S to 8, $\searrow$ i to 11 P. M. Brisk wind from 7½ A. M., to 2 P. M. Sheet L on W at 7½ P. M.
15	141.0	...	S S W & S	3.2	267.9	B to 11 A. M., $\searrow$ i to 3, B to 11 P. M. Brisk wind from 7¼ to 10¼ A. M.
16	142.0	0.04	S & S S W	7.2	79.4	B to 3, $\searrow$ i to 6 A. M., $\searrow$ i to 4, B to 9, O to 11 P. M. High wind from 9½ to 11½ P. M. L from 8 to 11 P. M. T between 10 & 11 P. M. Light R between 9 & 10 P. M.
17	144.0	0.13	S S W & S	13.0	70.0	$\searrow$ i to 3 A. M., $\searrow$ i to 11 P. M. High wind, T & L & Slight R from 8 to 10 P. M.
18	140.0	0.14	S & S by W	3.8	249.9	O to 6, $\searrow$ i to 11 A. M., $\searrow$ i to 5, B to 9, O to 11 P. M. T, L, at Midnight, 4 A. M. & 11 P. M. Slight R at Midnight 8¼ A. M. & 11 P. M.
19	139.8	...	S E & S S E	2.0	132.8	S to 5 A. M., $\searrow$ i to 1, $\searrow$ i to 4, S to 11 P. M. L from Midnight to 2 A. M. T at 1, 2, A. M. 3 & 4 P. M. D at 2 A. M. & 4 P. M.
20	145.0	0.22	S & S S E	2.0	99.8	$\searrow$ i to 5, $\searrow$ i to 9 A. M. $\searrow$ i to 8, $\searrow$ i to 11 P. M. Brisk wind T & R between 4 & 5 P. M.
21	142.5	...	S	0.8	99.0	$\searrow$ i to 7, B to 10 A. M., $\searrow$ i to 3, S to 6, $\searrow$ i to 11 P. M. T at 6 P. M.

$\searrow$  i Cirri, — i Strati,  $\searrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles.	
22	144.0	0.05	S	4.2	59.7	¶i to 9 A. M., ¶i to 4, ¶i to 11, P. M. High wind from 3 to 4 P. M. T from 2½ to 4 P. M. L at 3½ & 8 P. M. Light R at 3½ & 4½ P. M. ¶i to 8 A. M., ¶i to 4, ¶i to 6, B toll P. M. T at 3½ P. M.
23	144.0	...	S S W & S	...	80.5	¶i to 8 A. M., ¶i to 3, ¶i to 5, O to 11 P. M. Strong wind between 6 & 7 P. M. T at 3½ & 4 & from 6½ to 9 P. M. L from 6½ to 11 P. M. Slight R from 6½ to 8 P. M.
24	145.0	0.13	S & S W	34.0	120.0	S to 4 A. M., ¶i to 7, S to 9, O to 11 P. M. L from 8 to 11 P. M. High wind T & R between 10 & 11 P. M.
25	147.0	0.37	S S W & S	6.0	162.9	O to 2, ¶i to 10 A. M., ¶i to 7, O to 11 P. M. High wind from 8½ to 9 P. M. T & L at Midnight & from 7 to 9 P. M. R from 8½ to 10 P. M.
26	...	1.12	S & Variable	13.5	128.3	¶i to 3, O to 7 A. M., ¶i to 1 ¶i to 3, O to 7, ¶i & ¶i to 11 P. M. High wind from 3½ to 4½ A. M. T from 3½ to 6½ A. M. & at 5 P. M. L from 3½ to 5 A. M. R from 3½ to 7 A. M. & at 5 & 6 P. M.
27	...	0.83	S & S S W	12.0	219.1	¶i to 7 A. M., ¶i to 4, B to 11 P. M. Sheet L on W at 8 & 9 P. M. B to 7 A. M., ¶i to 3, ¶i to 11 P. M. Sheet L at 8 & 9 P. M.
28	134.0	...	S	...	97.7	S to 10 A. M., ¶i to 4, ¶i to 8, B to 11 P. M. Sheet L on W at 8 P. M.
29	146.5	...	S & S S W	0.8	133.5	S to 4 A. M., ¶i to 4, ¶i to 11 P. M. Sheet L on E at 8 & 9 P. M.
30	145.8	...	S S W & S	...	125.1	
31	142.5	...	S S W & S	0.8	148.1	

¶i Cirri —i Strati, ¶i Cumuli, ¶i Cirro-strati, ¶i Cumulo-strati ¶i Nimb,  
¶i Cirro-Cumuli. B clear, S stratoni, O overcast, T thunder, L lightning  
R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.698
Max. height of the Barometer occurred at 7 A. M. on the 3rd ...	29.912
Min. height of the Barometer occurred at 5 P. M. on the 9th ...	29.519
Extreme range of the Barometer during the month ... ..	0.393
Mean of the daily Max. Pressures ... ..	29.771
Ditto ditto Min. ditto ... ..	29.616
Mean daily range of the Barometer during the month ... ..	0.155

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	°
Mean Dry Bulb Thermometer for the month ... ..	84.3
Max. Temperature occurred at 3 P. M. on the 31st ... ..	96.0
Min. Temperature occurred at 8 & 11 P. M. on the 2nd ... ..	72.5
Extreme range of the Temperature during the month ... ..	23.5
Mean of the daily Max. Temperature ... ..	92.9
Ditto ditto Min. ditto, ... ..	77.3
Mean daily range of the Temperature during the month ... ..	15.6

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Mean Wet Bulb Thermometer for the month ... ..	78.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.8
Computed Mean Dew-point for the month ... ..	74.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.9

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.838

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	Troy grain.
Mean Weight of Vapour for the month ... ..	8.97
Additional Weight of Vapour required for complete saturation ...	3.31
Mean degree of humidity for the month, complete saturation being unity	0.73

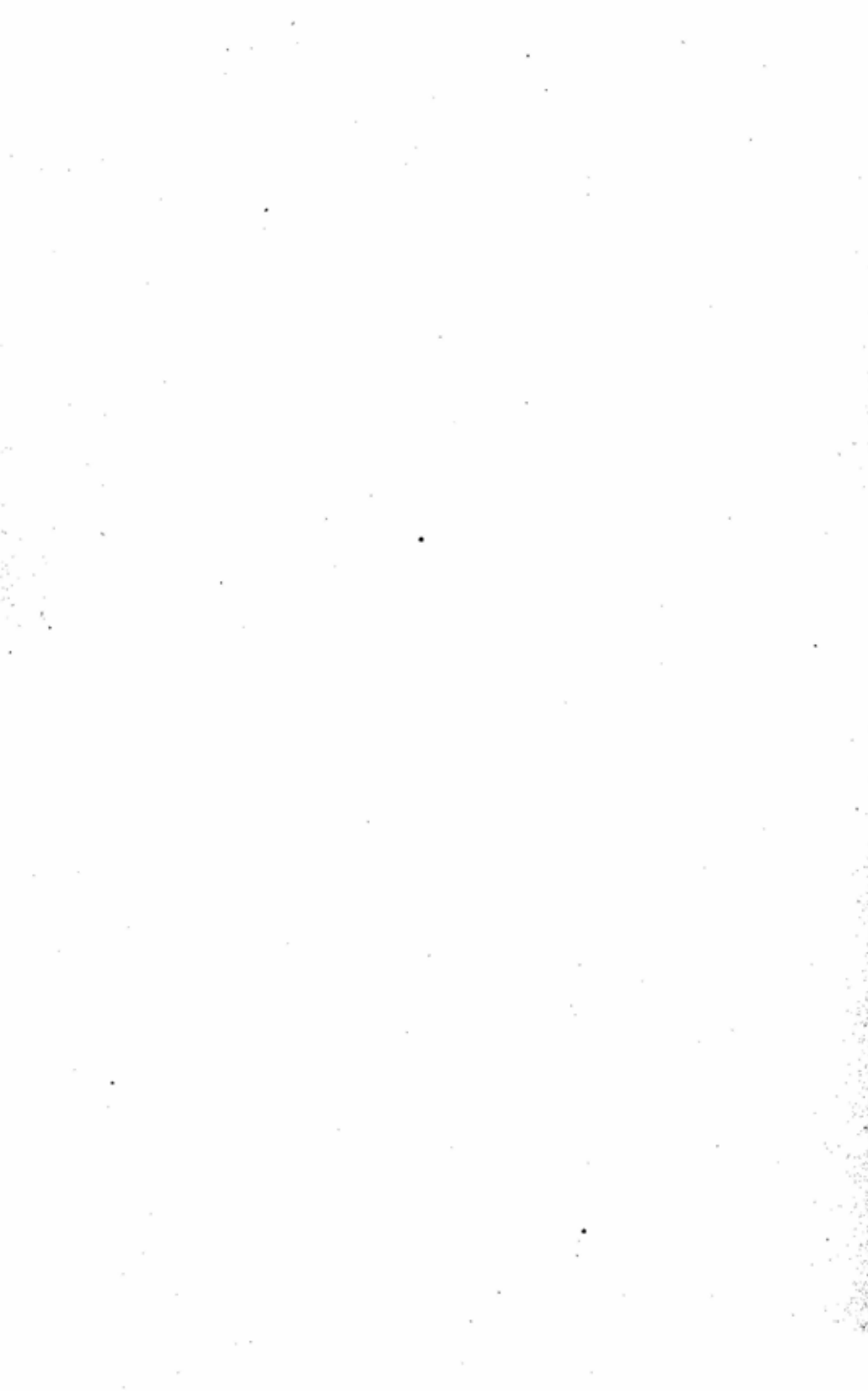
	°
Mean Max. Solar radiation Thermometer for the month ... ..	141.2

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	Inches.
Rained 19 days.—Max. fall of rain during 24 hours ... ..	1.12
Total amount of rain during the month ... ..	5.24
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	4.23
Prevailing direction of the Wind ... ..	S. & S. S. W.

\* Height 70 feet 10 inches above ground.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.566	29.639	29.466	0.173	87.4	97.7	79.0	18.7
2	.525	.575	.440	.135	88.1	96.6	79.9	16.7
3	.508	.580	.439	.141	88.1	98.0	83.7	14.3
4	.470	.537	.375	.162	90.1	98.7	83.3	15.4
5	.453	.501	.410	.091	84.1	88.5	80.0	8.5
6	.504	.568	.457	.111	84.6	92.5	80.0	12.5
7	.580	.673	.511	.162	87.3	95.0	80.2	14.8
8	.679	.738	.613	.125	82.4	89.7	78.7	11.0
9	.695	.769	.618	.151	82.3	85.5	80.0	5.5
10	.613	.663	.555	.108	83.3	86.5	79.6	6.9
11	.564	.606	.512	.094	82.4	84.5	80.5	4.0
12	.589	.664	.520	.135	80.5	82.6	77.2	5.4
13	.632	.692	.579	.113	82.9	85.7	81.0	4.7
14	.595	.664	.517	.147	84.1	92.2	79.5	12.7
15	.526	.583	.461	.122	86.1	93.0	80.5	12.5
16	.541	.613	.482	.131	85.9	94.0	81.0	13.0
17	.586	.649	.524	.125	83.5	89.5	79.8	9.7
18	.563	.617	.484	.133	83.1	89.3	80.0	9.3
19	.519	.560	.454	.106	82.2	86.5	79.5	7.0
20	.515	.548	.458	.090	83.0	87.7	79.5	8.2
21	.521	.573	.475	.098	85.5	90.8	82.0	8.8
22	.497	.550	.455	.095	83.2	88.5	80.9	7.6
23	.445	.509	.366	.143	80.1	82.9	79.5	2.5
24	.469	.540	.425	.115	82.3	96.0	78.5	7.5
25	.520	.574	.468	.106	83.5	88.7	81.0	7.7
26	.512	.549	.463	.086	83.7	90.4	81.0	9.4
27	.480	.523	.409	.114	83.3	86.4	81.0	5.4
28	.404	.471	.322	.149	82.2	86.0	79.5	6.5
29	.411	.456	.353	.103	82.6	86.7	80.0	6.7
30	.430	.478	.381	.091	80.5	82.4	77.9	4.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.7	5.7	78.3	9.1	0.949	10.09	3.36	0.75
2	82.6	5.8	79.1	9.3	.973	.34	.50	.75
3	81.8	6.3	78.0	10.1	.940	9.99	.73	.73
4	82.4	7.7	77.8	12.3	.934	.89	4.65	.68
5	81.2	2.9	79.2	4.9	.976	10.45	1.76	.86
6	79.6	5.6	76.1	8.5	.885	9.46	2.93	.76
7	81.9	5.4	78.7	8.6	.961	10.22	3.19	.76
8	79.9	2.5	78.1	4.3	.943	.14	1.47	.87
9	80.1	2.2	78.6	3.7	.958	.30	.28	.89
10	80.9	2.4	79.2	4.1	.976	.48	.45	.88
11	79.5	2.9	77.5	4.9	.925	9.94	.67	.86
12	78.8	1.7	77.6	2.9	.928	10.01	0.97	.91
13	81.0	1.9	79.7	3.2	.992	.66	1.13	.90
14	80.6	3.5	78.1	6.0	.943	.10	2.11	.83
15	81.4	4.7	78.1	8.0	.943	.06	.89	.78
16	82.2	3.7	79.6	6.3	.989	.56	.31	.82
17	80.9	2.6	79.1	4.4	.973	.45	1.55	.87
18	80.7	2.4	79.0	4.1	.970	.42	.41	.88
19	80.3	1.9	79.0	3.2	.970	.44	.10	.91
20	80.5	2.5	78.7	4.3	.961	.33	.49	.87
21	82.2	3.3	79.9	5.6	.998	.65	2.07	.84
22	81.2	2.0	79.8	3.4	.995	.69	1.20	.90
23	79.2	1.2	78.4	2.0	.952	.27	0.67	.94
24	79.7	2.6	77.9	4.4	.937	.08	1.50	.87
25	80.9	2.6	79.1	4.4	.973	.45	.55	.87
26	81.1	2.6	79.3	4.4	.979	.51	.56	.87
27	81.1	2.2	79.6	3.7	.989	.60	.33	.89
28	80.1	2.1	78.6	3.6	.958	.30	.24	.89
29	78.6	4.0	75.8	6.8	.876	9.41	2.27	.81
30	78.4	2.1	76.9	3.6	.908	.78	1.20	.89

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.549	29.728	29.427	0.301	82.0	86.7	79.9	6.8
1	.536	.720	.412	.308	81.6	86.3	80.0	6.3
2	.524	.710	.403	.307	81.4	86.0	78.7	7.3
3	.513	.696	.393	.303	81.4	85.8	78.8	7.0
4	.510	.690	.384	.306	81.3	85.6	78.5	7.1
5	.521	.709	.382	.327	81.2	85.5	78.5	7.0
6	.538	.722	.413	.309	81.4	85.5	78.0	7.5
7	.553	.740	.435	.305	82.2	85.5	77.9	7.6
8	.567	.747	.429	.318	83.5	87.3	78.0	9.3
9	.573	.755	.437	.318	84.9	90.0	79.5	10.5
10	.572	.757	.426	.331	86.4	92.5	80.4	12.1
11	.564	.769	.409	.360	87.1	95.1	78.0	17.1
Noon.	.547	.744	.386	.358	87.5	96.8	77.2	19.6
1	.530	.691	.376	.315	87.6	97.7	77.6	20.1
2	.509	.680	.333	.317	87.1	98.7	78.5	20.2
3	.491	.685	.322	.363	87.1	98.5	79.7	18.8
4	.478	.652	.330	.322	86.7	98.3	79.5	18.8
5	.476	.659	.332	.327	86.0	96.4	79.5	16.9
6	.487	.674	.349	.325	84.9	95.0	79.3	15.7
7	.510	.679	.379	.300	83.6	93.0	79.0	14.0
8	.525	.681	.397	.284	82.9	89.8	79.0	10.8
9	.542	.705	.418	.287	82.6	88.5	79.5	9.0
10	.557	.738	.427	.311	82.4	87.5	79.5	8.0
11	.556	.734	.430	.304	82.2	87.0	80.0	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Sarreyor General's Office, Calcutta,  
in the month of June 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.9	2.1	78.4	3.6	.952	10.23	1.24	0.89
1	79.6	2.0	78.2	3.4	.946	.19	.15	.90
2	79.7	1.7	78.5	2.9	.955	.29	0.98	.91
3	79.7	1.7	78.5	2.9	.955	.29	.98	.91
4	79.6	1.7	78.4	2.9	.952	.25	.99	.91
5	79.8	1.4	78.8	2.4	.964	.40	.81	.93
6	80.1	1.3	79.2	2.2	.976	.52	.75	.93
7	80.5	1.7	79.3	2.9	.979	.53	1.01	.91
8	81.1	2.4	79.4	4.1	.983	.54	.46	.88
9	81.4	3.5	78.9	6.0	.967	.34	2.15	.83
10	81.8	4.6	78.6	7.8	.958	.21	.85	.78
11	81.9	5.2	78.8	8.3	.964	.27	3.06	.77
Noon.	81.9	5.6	78.5	9.0	.955	.16	.33	.75
1	82.0	5.6	78.3	9.0	.958	.19	.33	.75
2	81.7	5.4	78.5	8.6	.955	.16	.17	.76
3	81.7	5.4	78.5	8.6	.955	.16	.17	.76
4	81.7	5.0	78.7	8.0	.961	.24	2.94	.78
5	81.3	4.7	78.0	8.0	.940	.03	.88	.78
6	80.8	4.1	77.9	7.0	.937	.02	.47	.80
7	80.1	3.5	77.6	6.0	.928	9.95	.08	.83
8	80.2	2.7	78.3	4.6	.949	10.18	1.61	.86
9	80.1	2.5	78.3	4.3	.949	.20	.48	.87
10	79.9	2.5	78.1	4.3	.943	.14	.47	.87
11	80.1	2.1	78.6	3.6	.958	.30	.24	.89

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches.		lb.	Miles.	
1	142.0	0.09	S S W & S S E	10.2	217.3	\i to 10 A. M., \i to 1, \i to 5, O to 11 P. M. High wind from 6½ to 6¾ P. M. T & L from 6½ to 8 P. M. Slight R between 6 & 7 & at 8 P. M. S to 2, B to 5 A. M., \i to 7, B to 11 P. M. B to 3, \i to 9 A. M., \i to 2, S to 7, \i to 11 P. M. \i to 5, S to 10 A. M., \i & \i to 7, O to 9, S to 11 P. M. Chiefly O. T from 1 to 3 P. M. L at 9 P. M. Light R after intervals.
2	139.2	...	S by W & S	...	Out of order	
3	147.2	...	S & S S E	...		
4	142.7	...	S E & S	...		
5	128.8	0.16	Variable.	...		
6	141.0	0.03	S S W & variable.	2.0	124.2	O to 7, \i to Noon, \i & \i to 6, O to 11 P. M. Sheet L from 6¾ to 10 P. M. Light R at Midnight 1 A. M. & 7 P. M. S to 2, \i to 8 A. M., \i & \i to 7, O to 11 P. M. Sheet L on W from 8 to 11 P. M. D at 10½ P. M. O to 7, \i to 11 A. M. O to 11 P. M. Sheet L from Midnight to 2 A. M. T at 11½ A. M. 1½, 3 & 4 P. M. Light R after intervals.
7	145.0	...	E S E, S S W & S	1.2	109.8	O to 4, \i to 6, \i to 11 P. M. Light R at Midnight 4½ & 7½ A. M. \i to 7, \i to 10 A. M. O to 5, S to 11 P. M.
8	127.0	0.14	S S E & S E	1.2	231.3	O to 3, \i to 6 A. M. O to 8, S to 11 P. M. D at 6 & 7 P. M. O. Brisk wind from 3½ to 7 & 10 to 10½ A. M. T at 8, 10 & 11 A. M. L at 8 A. M. R after intervals.
9	120.0	0.05	S S E & S	1.3	150.2	O to 8, \i to 11 P. M. R from Midnight to 1 P. M.
10	108.2	...	S by W & S	4.2	155.5	
11	96.0	...	S S W & S W	2.0	229.9	
12	...	1.10	S S W	6.0	245.1	
13	...	0.66	S S W & S W	1.8	204.0	

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of June 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb.	Miles.	
14	142.8	0.02	S S W	3.0	303.7	☼ to 6, S to 10 A. M., ☼ to 1 ☼ to 5, O to 11 P. M. T at 3¼, 5 & 6 P. M. Light R at 8 A. M. 6, 7 & 8½ P. M.
15	142.0	...	S W & S	0.8	277.9	O to 6 A. M., ☼ to 2, S to 6, ☼ to 11 P. M.
16	149.0	0.07	S	1.8	174.3	☼ to 2, ☼ to 9 A. M., ☼ to 3, O to 11 P. M. T from 3 to 7 P. M. L from 4½ to 8 P. M. Light R from 6½ to 11 P. M.
17	145.0	1.13	S E, S & E S E	2.0	143.3	☼ to 4, O to 7 A. M., ☼ to 11 P. M. T at 11 A. M. 2 & 5 P. M. L of 2 P. M. R after intervals between 11 A. M. to 8 P. M.
18	140.2	1.49	E & E by S	3.0	142.2	☼ to 1, B to 5 A. M., ☼ & ☼ to 4, O to 6, ☼ to 11 P. M. T at 1½ P. M. R at 1¼, 2¼, 4¼ & 9½ P. M.
19	120.2	1.29	S E & S	2.4	162.5	☼ to 8, ☼ to Noon, O to 5, S to 8, ☼ to 11 P. M. T between 12 & 1 P. M. R at 2½, 3½, from 10 A. M. to 3 at 4½ & 6½ P. M.
20	119.0	0.15	S & S by E	0.2	159.3	☼ to 1 A. M. O to 2, ☼ to 7, ☼ to 11 P. M. Slight R from 5 to 8 A. M. & at 6½ P. M.
21	138.0	...	S & S S W	...	200.8	O to 5, ☼ to 9 A. M., ☼ to 1, S to 6, clouds of different kinds to 11 P. M. Sheet L on N at 9 P. M. D at 12½ P. M.
22	126.5	1.01	S & S S W	...	149.5	☼ to 7, ☼ to Noon, O to 6, ☼ & ☼ to 11 P. M. T from 11½ A. M. to 1 P. M. R between 12 & 1 & at 6 P. M.
23	...	2.20	S S W & S by W	...	82.5	O to 2, ☼ to 5 A. M. O to 11 P. M. R at 8 & from 10 A. M. to 5 P. M.
24	109.7	0.42	S S W & S by W	0.3	189.8	O to 5, S to 7, ☼ & ☼ to 11 P. M. R at Midnight from 4 to 6½ at 8, 11 A. M. & 10½ P. M.

☼ i Cirri, — i Strati, ☼ i Cumuli, ☼ i Cirro-strati, ☼ i Cumulo-strati, ☼ i Nimbi,  
☼ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches.		lb	Miles.	
25	128.0	0.05	S S W & S	...	192.2	S to Noon, O to 5, \i to 8, B to 11 P. M. Slight R at 12½, & 1½ P. M.
26	148.5	0.12	S by E & S	0.4	119.9	B to 3, \i to 6, \i to 9 A. M., \i to 1, O to 5, \i to 7, B to 11 P. M. T from 2½ to 4 P. M. R at 1½ & 3 P. M.
27	130.0	0.43	S by W & S S W	1.0	96.6	B to 1, O to 4, \i to 10 A. M. O to 2, \i to 6, S to 11 P. M. T at 11 A. M. & 1 P. M. Sheet L between 7 & 8 P. M. R from 11 A. M. to 2 P. M.
28	139.0	0.98	S S W	4.0	115.5	O to 6, \i to 9, \i to Noon, O to 11 P. M. Brisk wind from 3½ to 9 P. M. R after intervals between Midnight & 5 P. M.
29	132.9	0.02	S S W	1.0	286.6	O to 8, \i to Noon, \i to 9, O to 11 P. M. Light R between Midnight & 1 A. M. & at 1½ P. M.
30	119.0	0.22	S S W & S	...	237.1	S to 4 A. M., O to 4, S to 6, \i to 8, O to 11 P. M. Slight R after intervals between 6 A. M. & 3 P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimb, \i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning R rain, D. drizzle.

# Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

## MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.530
Max. height of the Barometer occurred at 11 A. M. on the 9th ...	29.769
Min. height of the Barometer occurred at 3 P. M. on the 28th ...	29.322
Extreme range of the Barometer during the month ... ..	0.447
Mean of the daily Max. Pressures ... ..	29.589
Ditto ditto Min. ditto ... ..	29.467
Mean daily range of the Barometer during the month ... ..	0.122

	°
Mean Dry Bulb Thermometer for the month ... ..	84.0
Max. Temperature occurred at 2 P. M. on the 4th ... ..	98.7
Min. Temperature occurred at Noon on the 12th ... ..	77.2
Extreme range of the Temperature during the month ... ..	21.5
Mean of the daily Max. Temperature ... ..	89.4
Ditto ditto Min. ditto, ... ..	80.1
Mean daily range of the Temperature during the month ... ..	9.3

Mean Wet Bulb Thermometer for the month ... ..	80.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.3
Computed Mean Dew-point for the month ... ..	78.4
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	5.6

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.952

	Troy grain.
Mean Weight of Vapour for the month ... ..	10.19
Additional Weight of Vapour required for complete saturation ...	1.98
Mean degree of humidity for the month, complete saturation being unity	0.84

	°
Mean Max. Solar radiation Thermometer for the month ... ..	132.1

	Inches.
Rained 25 days,—Max. fall of rain during 24 hours ... ..	2.20
Total amount of rain during the month ... ..	11.83
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	10.73
Prevailing direction of the Wind ... ..	S. S. W. & S.

\* Height 70 feet 10 inches above ground.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.455	29.498	29.399	0.099	81.8	85.7	79.5	6.2
2	.461	.507	.406	.101	83.7	91.0	78.5	12.5
3	.486	.526	.434	.092	84.1	90.0	80.5	9.5
4	.502	.555	.452	.103	81.8	84.0	80.5	3.5
5	.545	.603	.491	.112	80.3	85.2	78.0	7.2
6	.614	.691	.560	.131	81.3	87.0	78.0	9.0
7	.694	.744	.633	.111	82.5	88.7	78.8	9.9
8	.671	.732	.582	.150	84.2	91.0	79.7	11.3
9	.628	.670	.561	.109	85.2	91.6	80.6	11.0
10	.642	.694	.580	.114	84.8	90.5	80.3	10.2
11	.624	.685	.561	.124	83.2	86.5	80.0	6.5
12	.494	.589	.416	.173	81.3	84.2	80.0	4.2
13	.422	.468	.367	.101	81.3	84.5	79.4	5.1
14	.316	.395	.210	.185	79.2	80.5	77.4	3.1
15	.398	.520	.262	.258	81.4	85.5	77.5	8.0
16	.506	.560	.447	.113	84.2	89.0	79.5	9.5
17	.498	.550	.426	.124	85.6	91.0	80.5	10.5
18	.471	.530	.407	.123	86.2	90.0	83.5	6.5
19	.425	.475	.370	.105	86.7	92.6	82.0	10.6
20	.413	.460	.335	.125	85.1	90.4	81.8	8.6
21	.439	.502	.383	.119	83.6	87.4	80.5	6.9
22	.463	.502	.389	.113	83.7	89.2	80.5	8.7
23	.413	.456	.354	.102	84.1	89.8	81.0	8.8
24	.396	.431	.337	.094	85.7	91.5	81.8	9.7
25	.431	.496	.387	.109	81.5	90.0	81.2	8.8
26	.504	.577	.454	.123	83.8	89.3	81.0	8.3
27	.586	.644	.536	.108	80.3	81.5	78.0	3.5
28	.596	.648	.534	.114	83.3	86.9	80.6	6.3
29	.562	.615	.520	.095	83.1	86.5	81.0	5.5
30	.552	.603	.487	.116	82.3	87.2	80.0	7.2
31	.530	.593	.480	.113	80.6	82.3	78.6	3.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.0	2.8	77.0	4.8	.910	9.79	1.61	0.86
2	80.6	3.1	78.4	5.3	.952	10.21	.86	.85
3	81.3	2.8	79.3	4.8	.979	.48	.73	.86
4	80.2	1.6	79.1	2.7	.973	.47	0.93	.92
5	79.4	0.9	78.8	1.5	.964	.40	.51	.95
6	79.3	2.0	77.9	3.4	.937	.10	1.14	.90
7	79.9	2.6	78.1	4.4	.943	.14	.50	.87
8	80.4	3.8	77.7	6.5	.931	9.96	2.28	.81
9	80.6	4.6	77.4	7.8	.922	.85	.76	.78
10	80.5	4.3	77.5	7.3	.925	.90	.56	.80
11	80.5	2.7	78.6	4.6	.958	10.28	1.61	.87
12	79.8	1.5	78.7	2.6	.961	.35	0.89	.92
13	79.3	2.0	77.9	3.4	.937	.10	1.14	.90
14	77.7	1.5	76.6	2.6	.899	9.71	0.85	.92
15	78.9	2.5	77.1	4.3	.913	.84	1.43	.87
16	80.6	3.6	78.1	6.1	.943	10.10	2.14	.83
17	81.1	4.5	77.9	7.7	.937	.00	.76	.78
18	83.1	3.1	80.9	5.3	1.030	.99	.00	.85
19	82.9	3.8	80.6	6.1	.921	.88	.30	.83
20	81.2	3.9	78.5	6.6	0.955	.21	.36	.81
21	80.3	3.3	78.0	5.6	.940	.07	1.96	.84
22	80.9	2.8	78.9	4.8	.967	.37	.70	.86
23	81.1	3.0	79.0	5.1	.970	.40	.81	.85
24	82.1	3.6	79.6	6.1	.989	.56	2.24	.83
25	81.1	3.4	78.7	5.8	.961	.29	.06	.83
26	80.7	3.1	78.5	5.3	.955	.25	1.85	.85
27	79.3	1.0	78.6	1.7	.958	.34	0.57	.95
28	80.8	2.5	79.0	4.3	.970	.42	1.51	.87
29	79.4	3.7	76.8	6.3	.905	9.71	2.15	.82
30	78.9	3.4	76.5	5.8	.896	.63	1.95	.83
31	78.9	1.7	77.7	2.9	.931	10.04	0.97	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.524	29.718	29.268	0.450	81.6	84.5	78.5	6.0
1	.514	.709	.274	.435	81.2	84.2	78.0	6.2
2	.502	.696	.273	.423	81.0	84.0	77.7	6.3
3	.491	.677	.266	.411	80.8	84.0	77.5	6.5
4	.485	.670	.262	.408	80.7	84.0	78.0	6.0
5	.493	.683	.274	.409	80.4	84.0	77.8	6.2
6	.506	.705	.300	.405	80.4	83.6	78.0	5.6
7	.522	.725	.331	.394	81.0	84.5	77.4	7.1
8	.536	.740	.338	.402	82.0	86.2	77.5	8.7
9	.546	.744	.353	.391	83.5	88.5	78.8	9.7
10	.547	.742	.355	.387	84.6	89.5	79.4	10.1
11	.540	.729	.358	.371	85.6	89.3	79.0	10.3
Noon.	.530	.717	.330	.387	86.1	90.5	80.0	10.5
1	.512	.713	.287	.426	86.3	91.5	79.4	12.1
2	.490	.693	.276	.417	86.2	91.7	78.0	13.7
3	.472	.680	.264	.416	86.4	92.6	78.5	14.1
4	.458	.641	.200	.381	86.1	91.8	78.7	13.1
5	.455	.633	.241	.392	85.5	91.4	79.0	12.4
6	.466	.636	.210	.426	84.4	91.4	79.3	12.1
7	.485	.653	.232	.421	83.3	86.7	78.6	8.1
8	.506	.673	.299	.374	82.8	86.7	79.0	7.7
9	.526	.695	.319	.376	82.5	86.2	78.5	7.7
10	.540	.732	.317	.415	82.2	85.5	78.5	7.0
11	.538	.726	.292	.434	81.8	84.7	78.5	6.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb. Thermometer Means are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.9	1.7	78.7	2.9	0.961	10.35	0.99	0.91
1	79.7	1.5	78.6	2.6	.958	.32	.89	.92
2	79.6	1.4	78.6	2.4	.958	.34	.80	.93
3	79.5	1.3	78.6	2.2	.958	.34	.73	.93
4	79.4	1.3	78.5	2.2	.955	.31	.73	.93
5	79.2	1.2	78.4	2.0	.952	.27	.67	.94
6	79.1	1.3	78.2	2.2	.946	.21	.73	.93
7	79.5	1.5	78.4	2.6	.952	.25	.89	.92
8	80.1	1.9	78.8	3.2	.964	.38	1.09	.91
9	80.6	2.9	78.6	4.9	.958	.28	.72	.86
10	80.9	3.7	78.3	6.3	.949	.16	2.23	.82
11	81.3	4.3	78.3	7.3	.949	.14	.62	.80
Noon.	81.3	4.8	77.9	8.2	.937	.00	.95	.77
1	81.4	4.9	78.0	8.3	.940	.03	.99	.77
2	81.4	4.8	78.0	8.2	.940	.03	.96	.77
3	81.2	5.2	77.6	8.8	.928	9.89	3.17	.76
4	81.1	5.0	77.6	8.5	.928	.89	.06	.76
5	81.0	4.5	77.8	7.7	.934	.97	2.75	.78
6	80.7	3.7	78.1	6.3	.943	10.10	.21	.82
7	80.3	3.0	78.2	5.1	.946	.15	1.78	.85
8	80.2	2.6	78.4	4.4	.952	.23	.52	.87
9	80.2	2.3	78.6	3.9	.958	.30	.34	.89
10	80.1	2.1	78.6	3.6	.958	.30	.24	.89
11	79.9	1.9	78.6	3.2	.958	.32	.08	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	130.0	0.08	S S W	2.0	166.9	Chiefly O. Brisk wind from 10 A. M. to 1 P. M. Slight R after intervals from 5 A. M. to 2 P. M.
2	137.5	0.19	S E & E S E	...	165.6	O to 5, \i to 8 A. M., \i to 4, clouds of different kinds to 11 P. M. T & L at 3 & 4 A. M. Slight R at Midnight, 1, 4½ 9½ A. M. 4½ & 5 P. M.
3	144.0	0.19	E & S E	0.2	170.1	\i & \i to 1 O to 8 A. M., \i to 4, S to 11 P. M. R after intervals from 1 to 8 P. M.
4	...	0.48	S	0.8	168.3	Chiefly O. R after intervals.
5	...	1.49	S & S S E	1.0	170.4	Chiefly O. T & L at Noon & 1½ P. M. R after intervals.
6	140.0	0.71	S E & S	...	133.7	O to 9 A. M., \i to 7, B to 11 P. M. Sheet L on N W at 11 P. M. R. after intervals.
7	138.0	0.11	SSE, S & S by W	1.0	112.4	B to 1, \i to 8 A. M., \i to 6, B to 11 P. M. Sheet L on N W at Midnight & 1 A. M. T & R between 12 & 1 P. M.
8	147.0	...	S by W & S S W	...	79.1	B to 3, \i to 8 A. M., \i to 6, \i to 11 P. M.
9	143.7	...	S S W & S	...	131.8	S to 2, \i to 5, Scuds to 9 A. M., \i to 5 \i to 8, S to 11 P. M.
10	147.5	...	...	...	160.0	B to 4, \i to 7 A. M., \i to 8, \i to 11 P. M. Sheet L on S at 10 P. M.
11	134.0	0.49	S & S S W	0.8	169.0	O to 7, \i to 11 A. M. O to 7 S to 11 P. M. R from 1 to 7 A. M., at Noon & 11 P. M.
12	...	3.33	Variable.	1.5	203.6	O. T & L after intervals. R nearly the whole day.
13	127.0	0.56	N by W & N N E	2.3	169.0	O to 4, \i to 6, O to 9, \i to 11 A. M. O to 3, \i to 11 P. M., Brisk wind from 9 A. M. to 1 P. M. T at 1 P. M. L at Midnight 1 A. M. & 8 P. M. R at 9, 11 A. M. & 1 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, B. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of July 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
14	...	1.09	N,NNE&ENE	11.2	406.9	O. High wind from midnight to 11 P. M. R nearly the whole day.
15	...	1.85	S E, & S S E	6.0	539.8	O to 10 A. M. S to 4, \i to 11 P. M. High wind from midnight to 3½ P. M. R from midnight to 9 A. M. & at 4 P. M.
16	144.0	0.06	S E, S by W & S	...	243.7	Scuds to 2, O to 4 A. M., \i to 6, \i to 11 P. M. Light R at 3 & 4 A. M.
17	144.0	...	S, WSW & S by W	...	143.9	Scuds to 3, \i to 7, \i to 11 A. M., \i to 6, \i to 11 P. M. D at 5½ & 6½ A. M.
18	...	0.12	S S W & variable.	...	111.1	\i to 1, O to 11 P. M. Slight R at 10½ A. M. 12, 5, 6, 7 & 8 P. M.
19	138.9	...	E N E & E by S	0.8	123.5	\i to 6, O to 8 A. M. \i to 7, \i to 11 P. M. T between 4 & 5 A. M. L at 4, 5 A. M. 7½, 10 & 11 P. M. D at 5½ A. M.
20	139.7	0.06	E & E S E	3.4	222.6	\i to 5, \i to 7 A. M., \i to 6, \i to 9, S to 11 P. M. T at 2½ P. M. Sheet L at midnight 8 & 10 P. M. Light R at 1½ & 4½ P. M.
21	138.0	0.08	S E & S S E	0.8	273.7	O to 5, \i to 9 A. M., \i to 2, \i to 7 \i to 11 P. M. Light R at 3, 11 A. M. 2, 6½ & 10 P. M.
22	145.0	0.35	S S E & S	...	196.2	Chiefly \i R at 12, 2, 4 & 5 P. M.
23	141.8	0.35	S	...	112.2	Scuds to 1½ to 10 A. M., \i to 2, \i to 6, B to 11 P. M. R between midnight & 1 A. M. at 2 & 3 P. M.
24	143.8	0.28	E S E	...	97.7	\i to 1, \i to 3, S to 7 A. M., \i to 7, \i to 11 P. M. R at 3½ A. M., 2½, 5½ & 7 P. M.
25	141.4	0.17	S E	...	232.9	\i to 2, O to 6 A. M., \i to 7, \i to 11 P. M. Sheet L on N W from 7½ to 9 P. M. R at 10½, 11½ A. M. 2½, 3½ & 10½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning. R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches.		lb	Miles.	
26	141.8	0.26	S E & S	0.5	192.2	S to 9 A. M., $\nearrow$ i to 11 P. M. Slight R after intervals.
27	...	1.11	S & S by E	...	186.1	$\searrow$ i to 1. A. M. O to 7, B to 11 P. M. R from 1 to 4½, & 8 A. M. to 2 P. M.
28	125.0	...	S S W	0.8	147.2	$\searrow$ i to 2, S to 7, O to 11 P. M. $\nearrow$ i to 5, Scuds to 11 P. M. Brisk wind from 4 to 8 P. M.
29	125.5	...	S S W	1.9	311.3	O to 11 A. M., $\nearrow$ i to 6, O to 11 P. M. Brisk wind from 4 A. M. to 3½ P. M. Sheet L on N W at 9 P. M. D at 10 A. M. & 11 P. M.
30	136.6	0.04	S W & S S W	2.0	266.1	O to 9 A. M. S to 2, O to 5, S to 11 P. M. Brisk wind between 2 & 3 P. M. Light R at 3, 4 & 11 P. M.
31	...	0.45	S W & S S W	4.5	215.0	O. Slight R after intervals.

$\searrow$  i Cirri — i Strati,  $\nearrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\nearrow$  i Cumulo-strati  $\searrow$  i Nimb,  $\searrow$  i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

## MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.508
Max. height of the Barometer occurred at 9 A. M. on the 7th ...	29.744
Min. height of the Barometer occurred at 6 P. M. on the 14th ...	29.210
Extreme range of the Barometer during the month ... ..	0.534
Mean of the daily Max. Pressures ... ..	29.565
Ditto ditto Min. ditto ... ..	29.444
Mean daily range of the Barometer during the month ... ..	0.121

	°
Mean Dry Bulb Thermometer for the month ... ..	83.2
Max. Temperature occurred at 3 P. M. on the 19th ... ..	92.6
Min. Temperature occurred at 7 A. M. on the 14th ... ..	77.4
Extreme range of the Temperature during the month ... ..	15.2
Mean of the daily Max. Temperature ... ..	87.8
Ditto ditto Min. ditto, ... ..	80.0
Mean daily range of the Temperature during the month ... ..	7.8

Mean Wet Bulb Thermometer for the month ... ..	80.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.9
Computed Mean Dew-point for the month ... ..	78.3
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	4.9

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.949

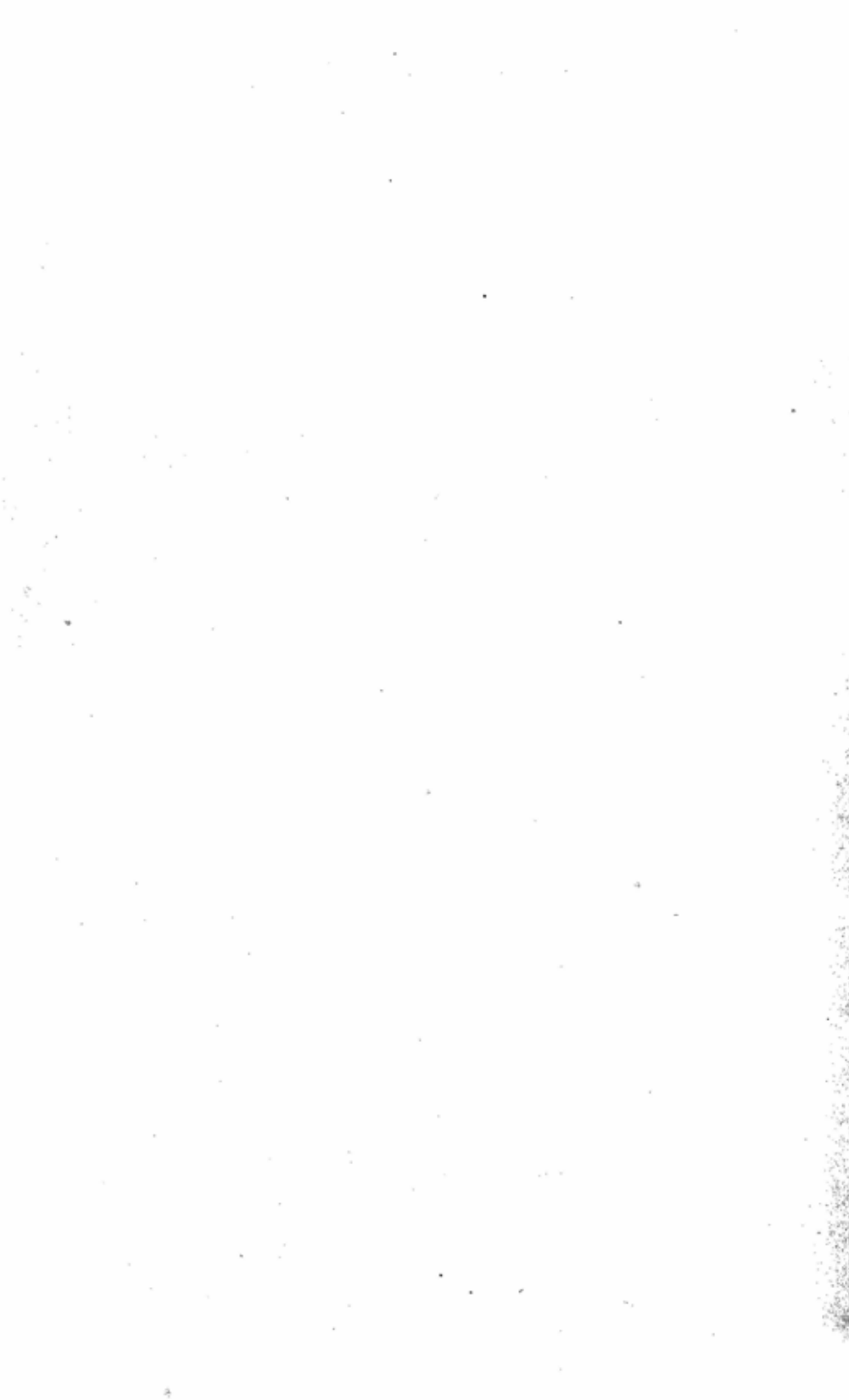
	Troy grain.
Mean Weight of Vapour for the month ... ..	10.18
Additional Weight of Vapour required for complete saturation ...	1.71
Mean degree of humidity for the month, complete saturation being unity	0.86

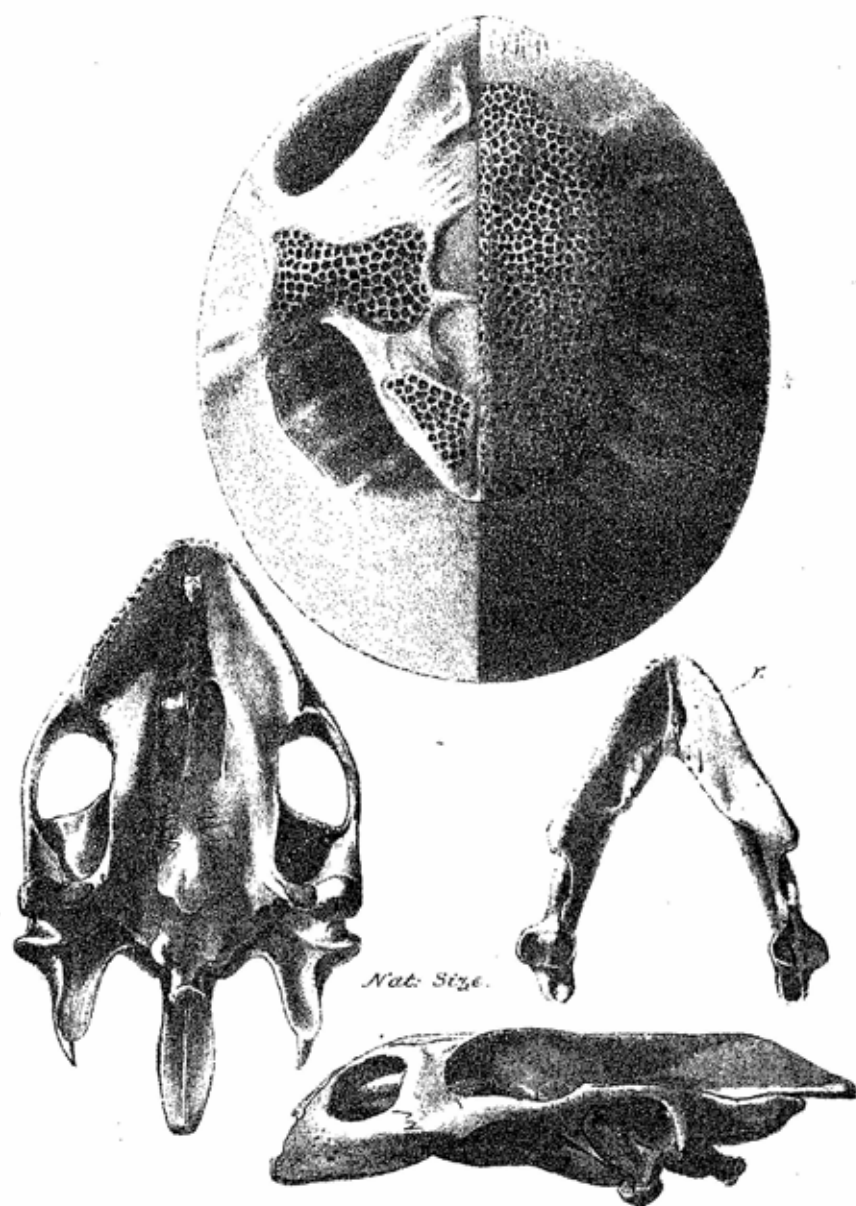
	°
Mean Max. Solar radiation Thermometer for the month ... ..	138.9

	Inches.
Rained 27 days,—Max. fall of rain during 24 hours ... ..	3.33
Total amount of rain during the month ... ..	13.90
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	12.37
Prevailing direction of the Wind ... ..	S. & S. S. W.

\* Height 70 feet 10 inches above ground.



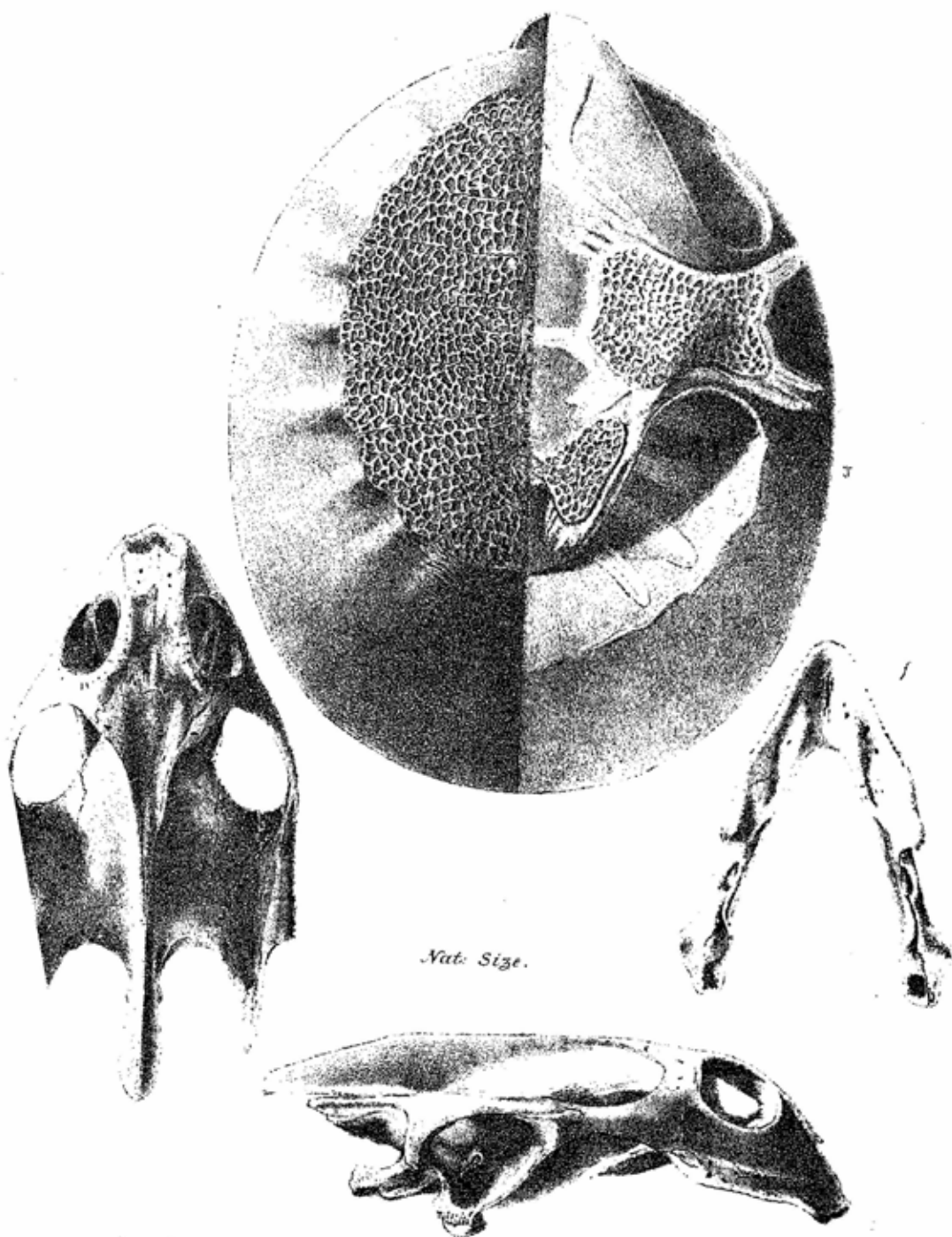




*J. Schaumburg, Lith.*

T. GRAYII. n. s.





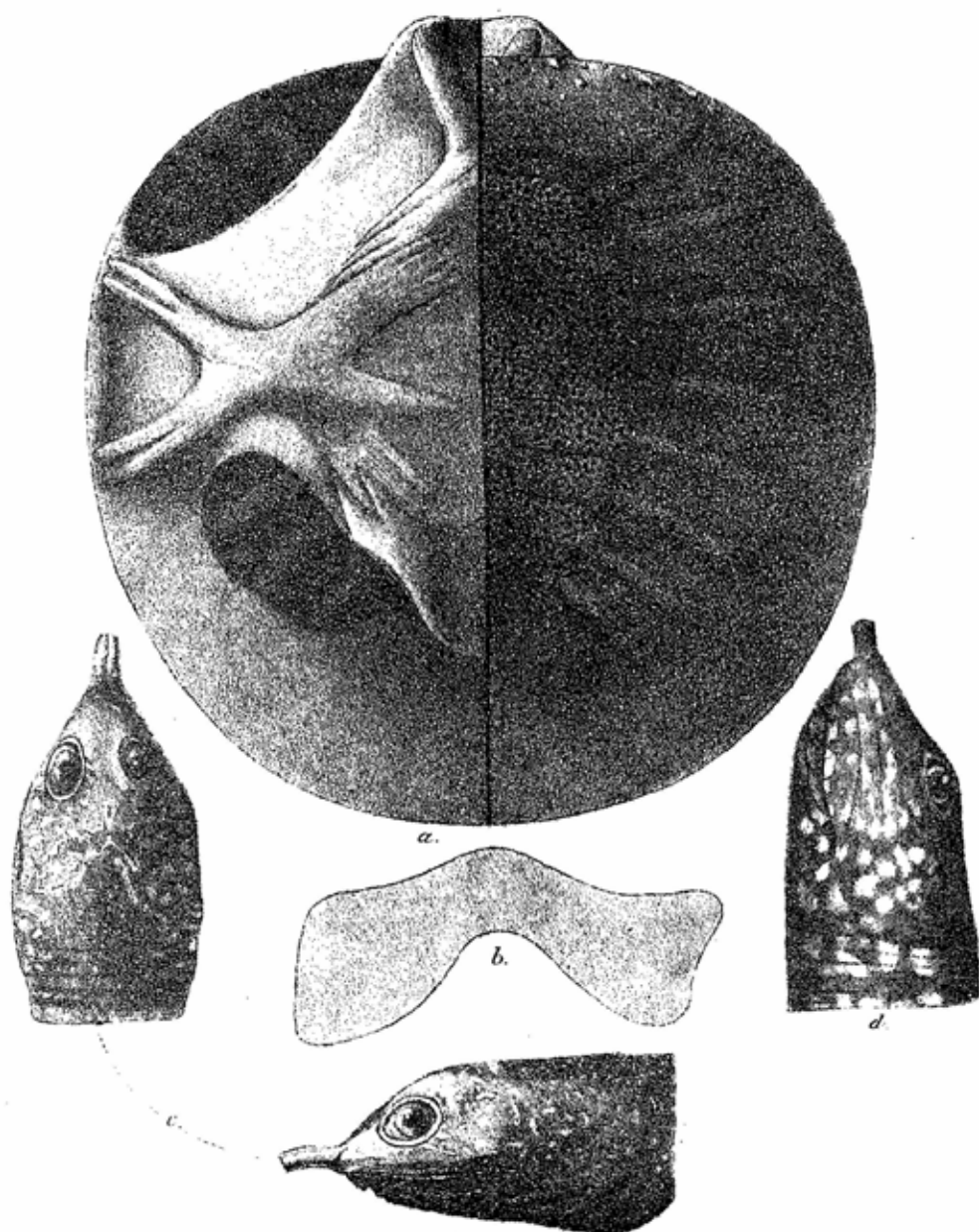
Nat. Size.

Amberg, Lith.

*T. OCELLATUS*. Buc: Ham:  
*T. hircum*. B. H. apud. J. Anderson.







*J. Schauburg, Lith.*

*a, b, c.* T. EHIPPIUM. n. s.

*d.* T. JAVANICUS. Geoff.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.603	29.657	29.544	0.113	80.4	83.0	77.4	5.6
2	.627	.676	.569	.107	81.8	86.9	77.0	9.9
3	.616	.660	.553	.107	80.6	84.5	77.8	6.7
4	.589	.641	.518	.123	82.2	87.3	77.4	9.9
5	.568	.624	.522	.102	82.1	85.3	80.0	5.3
6	.604	.677	.546	.131	81.5	84.5	79.0	5.5
7	.648	.703	.599	.104	81.7	87.8	79.0	8.8
8	.609	.664	.544	.120	82.1	87.0	78.3	8.7
9	.621	.684	.569	.115	81.5	86.4	78.5	7.9
10	.678	.742	.615	.127	82.3	87.4	79.0	8.4
11	.641	.696	.539	.157	83.1	88.1	80.0	8.1
12	.607	.666	.543	.123	84.3	91.4	79.8	11.6
13	.559	.618	.458	.160	84.9	90.7	80.5	10.2
14	.528	.576	.463	.113	83.6	87.9	80.0	7.9
15	.526	.576	.466	.110	83.1	88.7	80.0	8.7
16	.554	.601	.494	.107	83.7	88.5	79.5	9.0
17	.550	.603	.479	.124	84.3	89.8	81.0	8.8
18	.537	.591	.463	.128	83.2	86.0	81.5	4.5
19	.576	.636	.523	.113	83.0	88.0	81.0	7.0
20	.622	.671	.568	.103	83.6	90.2	80.5	9.7
21	.626	.695	.553	.142	83.6	89.5	80.2	9.3
22	.601	.643	.549	.094	82.8	85.5	80.8	4.7
23	.582	.646	.525	.121	82.3	86.0	79.0	7.0
24	.604	.687	.544	.143	82.4	85.5	79.2	6.3
25	.679	.723	.630	.093	81.0	87.0	79.0	8.0
26	.676	.737	.608	.129	81.0	87.4	76.9	10.5
27	.669	.728	.597	.131	82.6	87.0	79.0	8.0
28	.676	.721	.608	.113	83.4	88.2	80.5	7.7
29	.712	.770	.641	.129	84.2	90.5	80.7	9.8
30	.743	.804	.675	.129	84.5	90.5	81.4	9.1
31	.723	.788	.651	.137	84.4	90.5	81.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.7	1.7	77.5	2.9	0.925	9.98	0.96	0.91
2	79.6	2.2	78.1	3.7	.943	10.14	1.26	.89
3	78.6	2.0	77.2	3.4	.916	9.89	.12	.90
4	79.2	3.0	77.1	5.1	.913	.82	.72	.85
5	80.1	2.0	78.7	3.4	.961	10.35	.16	.90
6	79.3	2.2	77.8	3.7	.934	.05	.26	.89
7	79.0	2.7	77.1	4.6	.913	9.82	.55	.86
8	78.9	3.2	76.7	5.4	.902	.70	.81	.84
9	79.0	2.5	77.2	4.3	.916	.87	.44	.87
10	79.6	2.7	77.7	4.6	.931	10.00	.58	.86
11	80.5	2.6	78.7	4.4	.961	.33	.53	.87
12	80.4	3.9	77.7	6.6	.931	9.96	2.32	.81
13	80.8	4.1	77.9	7.0	.937	10.02	.47	.80
14	81.2	2.4	79.5	4.1	.986	.57	1.46	.88
15	80.5	2.6	78.7	4.4	.961	.33	.53	.87
16	80.3	3.4	77.9	5.8	.937	.04	2.03	.83
17	81.2	3.1	79.0	5.3	.970	.40	1.88	.85
18	81.2	2.0	79.8	3.4	.995	.69	.20	.90
19	81.1	1.9	79.8	3.2	.995	.69	.13	.91
20	81.5	2.1	80.0	3.6	1.001	.72	.31	.89
21	81.1	2.5	79.3	4.3	0.979	.51	.52	.87
22	80.9	1.9	79.6	3.2	.989	.63	.12	.91
23	80.5	1.8	79.2	3.1	.976	.50	.08	.91
24	80.6	1.8	79.3	3.1	.979	.53	.08	.91
25	79.2	1.8	77.9	3.1	.937	.10	.04	.91
26	78.6	2.4	76.9	4.1	.908	9.78	.36	.88
27	79.9	2.7	78.0	4.6	.940	10.09	.59	.86
28	80.8	2.6	79.0	4.4	.970	.42	.54	.87
29	80.7	3.5	78.2	6.0	.946	.13	2.11	.83
30	81.1	3.4	78.7	5.8	.961	.29	.06	.83
31	81.2	3.2	79.0	5.4	.970	.40	1.91	.85

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.637	29.760	29.537	0.223	81.1	83.5	78.0	5.5
1	.626	.744	.531	.213	80.8	83.0	76.9	6.1
2	.614	.733	.522	.211	80.6	82.8	76.9	5.9
3	.603	.717	.514	.203	80.4	82.5	77.0	5.5
4	.596	.728	.506	.222	80.2	82.4	77.5	4.9
5	.605	.744	.513	.231	80.0	82.2	77.4	4.8
6	.619	.752	.531	.221	80.0	82.0	77.4	4.6
7	.633	.766	.541	.225	80.6	82.9	77.4	5.5
8	.650	.777	.561	.216	81.9	84.0	77.7	6.3
9	.662	.791	.565	.226	83.4	86.4	78.5	7.9
10	.667	.801	.563	.238	84.8	88.0	79.5	8.5
11	.656	.804	.546	.258	85.8	89.5	80.0	9.5
Noon.	.639	.781	.540	.241	86.2	89.5	80.0	9.5
1	.618	.742	.519	.223	86.0	90.5	80.0	10.5
2	.593	.718	.486	.232	86.1	90.5	82.3	8.2
3	.571	.691	.466	.225	85.6	91.4	79.0	12.4
4	.559	.681	.458	.223	85.1	90.5	79.5	11.0
5	.560	.675	.463	.212	84.4	89.0	79.5	9.5
6	.573	.682	.476	.206	83.1	87.6	77.0	10.6
7	.592	.699	.494	.205	82.6	86.0	78.2	7.8
8	.617	.738	.510	.228	82.3	84.5	79.0	5.5
9	.639	.753	.532	.221	81.9	83.5	78.5	5.0
10	.652	.786	.555	.231	81.6	83.5	78.0	5.5
11	.650	.776	.550	.226	81.4	83.7	77.8	5.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- nighl.	79.8	1.3	78.9	2.2	.0967	10.43	0.74	0.93
1	79.6	1.2	78.8	2.0	.964	.40	.67	.94
2	79.4	1.2	78.6	2.0	.958	.34	.67	.94
3	79.2	1.2	78.4	2.0	.952	.27	.67	.94
4	79.1	1.1	78.3	1.9	.949	.24	.64	.94
5	79.0	1.0	78.3	1.7	.949	.24	.57	.95
6	79.0	1.0	78.3	1.7	.949	.24	.57	.95
7	79.4	1.2	78.6	2.0	.958	.34	.67	.94
8	80.0	1.9	78.7	3.2	.961	.35	1.09	.91
9	80.6	2.8	78.6	4.8	.958	.28	.68	.86
10	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
11	81.3	4.5	78.1	7.7	.943	.06	.77	.78
Neon.	81.3	4.9	77.9	8.3	.937	.00	.99	.77
1	81.2	4.8	77.8	8.2	.934	9.97	.94	.77
2	81.3	4.8	77.9	8.2	.937	10.00	.95	.77
3	81.3	4.3	78.3	7.3	.949	.14	.62	.80
4	81.0	4.1	78.1	7.0	.943	.08	.49	.80
5	80.8	3.6	78.3	6.1	.949	.16	.15	.83
6	80.1	3.0	78.0	5.1	.940	.09	1.77	.85
7	80.0	2.6	78.2	4.4	.946	.17	.51	.87
8	80.2	2.1	78.7	3.6	.961	.33	.25	.89
9	80.0	1.9	78.7	3.2	.961	.35	.09	.91
10	79.8	1.8	78.5	3.1	.955	.29	.05	.91
11	79.8	1.6	78.7	2.7	.961	.35	0.92	.92

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		h	Miles.	
1	...	0.61	S W & S S W	0.5	208.2	O. Slight R after intervals.
2	126.5	1.21	S S W & S W	2.0	248.9	O to 8 A. M., $\sim$ i to 3, O to 11 P. M. Brisk wind from 12 to 6½ P. M. T & L between 5 & 6 P. M. R at 1 & 6 A. M., & from 4½ to 11 P. M.
3	130.0	0.50	S W & S S W	0.8	249.0	O. R after intervals.
4	131.7	0.44	S W & S	0.3	125.3	O to 7 A. M., $\sim$ i to 12, $\sim$ i to 5, S to 11 P. M. R from 2 to 6 A. M., & at 2½ P. M.
5	100.0	0.12	S S W & S W	...	109.9	$\sim$ i & $\sim$ i to 8 A. M. O to 11 P. M. T at 10½ A. M. & 11 P. M. L at 8, 10 & 11 P. M. Slight R from 10½ A. M. to 1, at 10 & 11 P. M.
6	138.0	0.37	S E & S S E	1.3	87.1	Chiefly O. T from midnight to 2 A. M. L from midnight to 4 A. M. R after intervals.
7	141.5	0.37	E S E & S S E	5.0	230.9	O to 3, Scuds to 8 A. M. $\sim$ i to 8, $\sim$ i to 11 P. M. R from 12½ to 1½ & at 4½ P. M.
8	136.7	0.07	S E & S S E	1.2	195.2	Scuds to 8 A. M., $\sim$ i to 11 P. M. T at 1½ P. M. Slight R at 11½ A. M. 1½, 2½, 8 & 10 P. M.
9	144.0	0.33	S E, S by E & S	0.8	171.3	Chiefly $\sim$ i. T at 11½ A. M. Slight R after intervals.
10	142.4	0.03	S S E & S	...	144.0	$\sim$ i to 2 A. M., $\sim$ i to 4, $\sim$ i to 11 P. M. T & L at 2½ A. M. Light R at 1½, 6½, 9½ & 10½ A. M.
11	143.6	0.20	S by E, S & S by W	0.3	129.1	B to 4, $\sim$ i, to 7 A. M., $\sim$ i to 1 O to 3, $\sim$ i to 9, $\sim$ i to 11 P. M. T at 1, 1½ & 5 P. M. Slight R at 11 A. M., 12½ & 2 P. M.
12	147.0	...	S, E & S S W	...	64.1	$\sim$ i to 4, B to 7 A. M., $\sim$ i to 5, $\sim$ i to 9, B to 11 P. M.
13	143.3	...	S	...	83.0	B to 5, $\sim$ i to 9 A. M., $\sim$ i to 7, $\sim$ i to 11 P. M. Sheet L from 6½ to 8 & at 11½ P. M.

$\sim$  i Cirri, — i Strati,  $\sim$  i Cumuli,  $\sim$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\sim$  i Nimbi,  $\sim$  i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of August 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
14	120.0	1.02	S by W & variable	1.3	84.5	☼ to 1, S to 8 A. M., ☼ to 3, O to 6, S to 11 P. M. TL & R between 12 & 1 P. M.
15	142.5	0.70	E by S & S	1.8	111.8	☼ & ☼ to 7 A. M., ☼ to 3 O to 6, Scuds to 11 P. M. T & L at 4½ P. M. R at 3½, 4, 5, 9½ & 11 P. M.
16	150.2	0.36	...	...	175.4	☼ & ☼. R after intervals from midnight to 6½ A. M.
17	148.5	0.24	S S E	...	132.3	☼ to 6 A. M., ☼ to 7, ☼ & ☼ to 11 P. M. Slight R at 4, 6½ & 7½ P. M.
18	...	0.11	S & S by E	...	99.0	☼ to 8 A. M. O to 1, ☼ to 3, ☼ to 9, ☼ to 11 P. M. T at 9½ & 10 A. M. Sheet L at 8½ & 10½ P. M. Slight R after intervals from midnight to Noon & at 11½ P. M.
19	128.0	0.79	S E	...	98.3	☼ to 5, ☼ to 9, ☼ to 11 A. M. O to 11 P. M. T at 12½, 1 & 2 P. M. R from 10½ A. M. to 12 & at 8 P. M.
20	141.5	0.56	E S E & S by E	...	85.6	Chiefly ☼ T between 1 & 2 P. M. L at 1½ & 9 P. M. R after intervals from 10½ to 4½ P. M.
21	148.0	0.99	S	1.0	82.5	☼ to 1, O to 3, ☼ to 6 A. M. ☼ to 2, O to 4, ☼ to 7, B to 11 P. M. R at 2, 3, 9½ A. M. & 2½ P. M.
22	111.0	0.14	S & S by E	0.6	110.7	☼ to 2 A. M., ☼ to 5, ☼ to 11 P. M. R at 11 A. M., 12 & 4½ P. M.
23	...	0.30	S	...	136.5	O to 11 A. M., ☼ to 6, S to 11 P. M. Slight R from 3 to Noon.
24	...	0.57	SS W & W S W	1.2	173.3	O. T at 4½ & 5½ P. M. R at 8 A. M. & from 5½ to 10 P. M.
25	120.0	0.66	S & variable.	...	82.4	O to 9 A. M. S to 12, ☼ to 2, O to 11 P. M. T at 3½ P. M. R from 3 to 9 P. M.
26	141.8	0.56	S E & E S E	...	78.7	O to 7 A. M. ☼ to 7, S to 11 P. M. T at 1 A. M. R from Midnight to 4 A. M.

☼ i Cirri,—i Strati, ☼ i Cumuli, ☼ i Cirro-strati, ☼ i Cumulo-strati, ☼ i Nimbi, ☼ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<i>o</i>	Inches.		<i>lb</i>	Miles.	
27	123.0	...	S E & S	...	55.3	S to 5, \i to 8 A. M., \i to 3 S to 11 P. M. Sheet L on S at 1 A. M.
28	137.7	0.62	S	1.0	118.4	S to 2, \i to 7 A. M., \i to 8, \i to 11 P. M. T at 3½ P. M. Sheet L on N W from 8 to 11 P. M. R at 10 A. M., 12 & 2½ P. M.
29	146.0	0.58	S & S S E	...	88.6	S to 3, \i to 8 A. M., \i to 7, \i to 11 P. M. T & R between 5 & 6 P. M. L at 5½, 7½ & 8½ P. M.
30	153.5	...	S, E & S by E	...	92.0	\i to 6, \i to 10 A. M., \i to 5, \i to 11 P. M. Sheet L at midnight 1 A. M. & 10 P. M.
31	147.0	0.19	S by E & S	...	86.7	\i to 7 A. M., \i to 4, S to 9, B to 11 P. M. T, L & R from 8½ to 9½ P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimb,  
\i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.618
Max. height of the Barometer occurred at 11 A. M. on the 30th ...	29.804
Min. height of the Barometer occurred at 4 P. M. on the 13th ...	29.458
Extreme range of the Barometer during the month ... ..	0.346
Mean of the daily Max. Pressures ... ..	29.674
Ditto ditto Min. ditto ... ..	29.553
Mean daily range of the Barometer during the month ... ..	0.121

	°
Mean Dry Bulb Thermometer for the month ... ..	82.7
Max. Temperature occurred at 3 P. M. on the 12th ... ..	91.4
Min. Temperature occurred at 1 & 2 A. M. on the 26th ... ..	76.9
Extreme range of the Temperature during the month ... ..	14.5
Mean of the daily Max. Temperature ... ..	87.6
Ditto ditto Min. ditto, ... ..	79.5
Mean daily range of the Temperature during the month ... ..	8.1

Mean Wet Bulb Thermometer for the month ... ..	80.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.5
Computed Mean Dew-point for the month ... ..	78.4
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	4.3

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.952

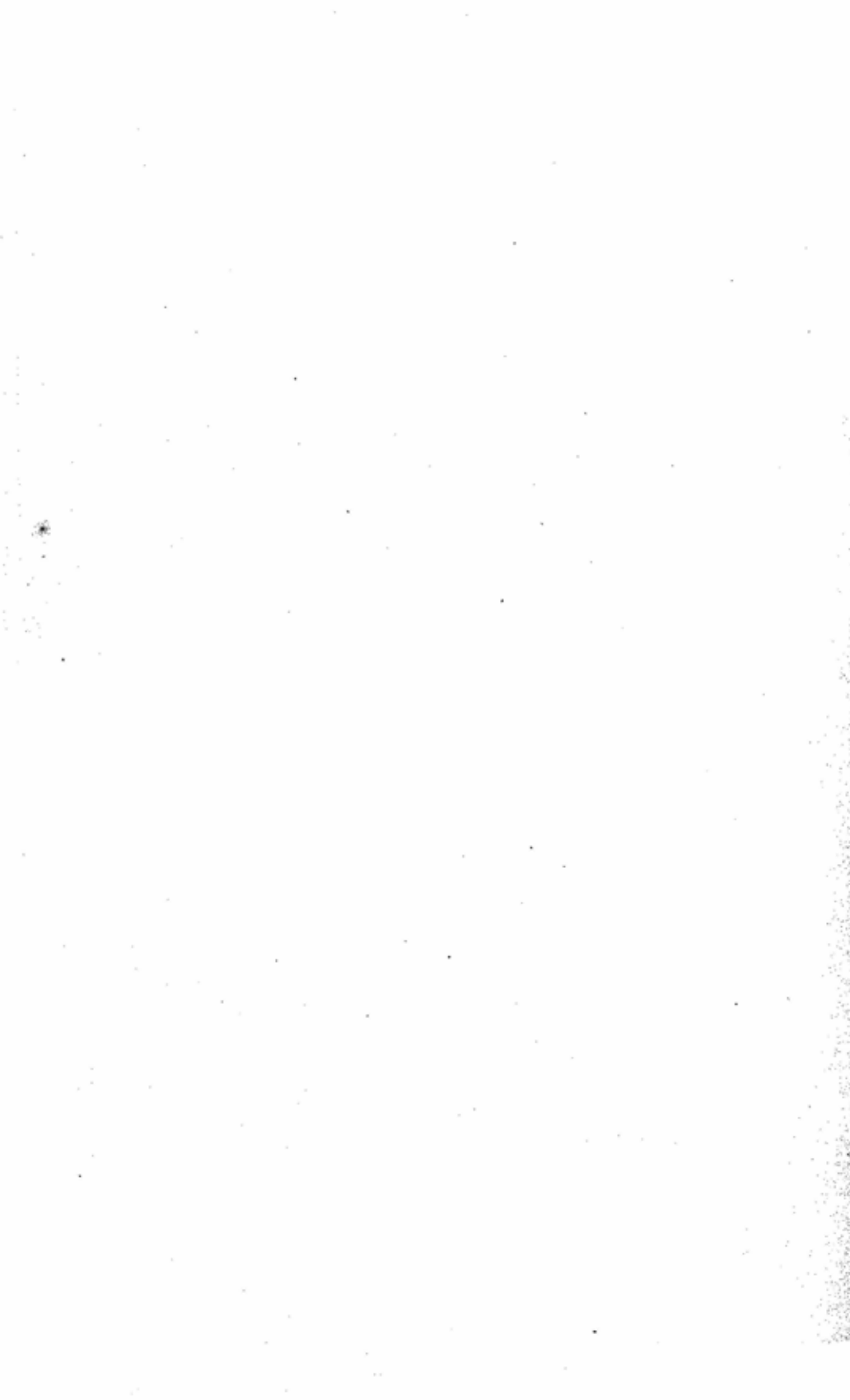
	Troy grain.
Mean Weight of Vapour for the month ... ..	10.23
Additional Weight of Vapour required for complete saturation ... ..	1.49
Mean degree of humidity for the month, complete saturation being unity	0.87

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.4

	Inches.
Rained 27 days,—Max. fall of rain during 24 hours ... ..	1.21
Total amount of rain during the month ... ..	12.64
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	11.46
Prevailing direction of the Wind ... .. S. & S. E.	

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.683	29.751	29.612	0.139	84.7	90.5	81.0	9.5
2	.638	.691	.560	.131	83.8	88.9	81.5	7.4
3	.610	.657	.543	.114	84.8	90.2	81.0	9.2
4	.630	.676	.583	.093	83.1	87.2	81.0	6.2
5	.645	.701	.584	.117	79.8	86.0	78.5	2.1
6	.661	.716	.590	.126	81.5	85.0	79.0	6.0
7	.620	.678	.535	.143	82.9	88.4	79.0	9.4
8	.550	.612	.466	.166	82.5	88.9	79.5	9.4
9	.505	.569	.457	.132	80.4	83.7	77.8	5.9
10	.630	.729	.543	.186	81.5	86.0	79.0	7.0
11	.716	.770	.654	.116	84.3	90.8	79.2	11.6
12	.721	.787	.656	.111	85.0	91.7	81.8	9.9
13	.715	.774	.633	.141	84.6	89.0	80.8	8.2
14	.713	.773	.633	.140	84.0	90.6	80.5	10.1
15	.708	.751	.630	.121	83.9	90.5	80.5	10.0
16	.730	.797	.670	.127	83.1	88.5	80.0	8.5
17	.773	.821	.735	.086	79.0	88.0	77.8	2.2
18	.815	.870	.766	.104	79.6	84.6	78.0	6.6
19	.826	.903	.764	.139	80.6	86.7	78.0	8.7
20	.805	.863	.728	.138	83.1	89.3	78.1	11.2
21	.811	.875	.746	.129	84.3	90.5	79.5	11.0
22	.844	.915	.777	.138	83.8	89.0	80.0	9.0
23	.785	.857	.703	.154	84.2	90.0	80.7	9.3
24	.744	.800	.686	.114	80.8	85.0	78.5	6.5
25	.747	.808	.670	.138	80.9	84.1	79.7	4.4
26	.739	.801	.673	.128	82.6	89.0	79.0	10.0
27	.724	.788	.652	.136	84.5	90.5	81.2	9.3
28	.685	.731	.611	.120	83.3	88.5	79.5	9.0
29	.675	.747	.598	.149	83.7	89.5	79.5	10.0
30	.660	.711	.582	.129	84.8	90.4	80.5	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.3	3.4	78.9	5.8	0.967	10.34	2.08	0.83
2	81.0	2.8	79.0	4.8	.970	.40	1.70	.86
3	81.4	3.4	79.0	5.8	.970	.37	2.09	.83
4	80.1	3.0	78.0	5.1	.940	.09	1.77	.85
5	78.8	1.0	78.1	1.7	.943	.18	1.57	.95
6	79.7	1.8	78.4	3.1	.952	.25	1.06	.91
7	80.0	2.9	78.0	4.9	.940	.09	.70	.86
8	79.6	2.9	77.6	4.9	.928	9.97	.67	.86
9	78.5	1.9	77.2	3.2	.916	.89	.05	.90
10	79.5	2.0	78.1	3.4	.943	10.16	.15	.90
11	80.7	3.6	78.2	6.1	.946	.13	2.15	.83
12	81.7	3.3	79.4	5.6	.983	.49	.04	.84
13	80.9	3.7	78.3	6.3	.949	.16	.23	.82
14	80.5	3.5	78.0	6.0	.940	.07	.10	.83
15	79.9	4.0	77.1	6.8	.913	9.78	.35	.81
16	79.0	4.1	76.1	7.0	.885	.50	.36	.80
17	77.5	1.5	76.4	2.6	.893	.66	0.84	.92
18	78.1	1.5	77.0	2.6	.910	.83	.86	.92
19	79.0	1.6	77.9	2.7	.937	10.10	.91	.92
20	79.8	3.3	77.5	5.6	.925	9.92	1.04	.84
21	80.7	3.6	78.2	6.1	.946	10.13	2.15	.83
22	80.6	3.2	78.4	5.4	.952	.21	1.89	.84
23	80.5	3.7	77.9	6.3	.937	.04	2.20	.82
24	79.0	1.8	77.7	3.1	.931	.04	1.03	.91
25	79.5	1.4	78.5	2.4	.955	.31	0.79	.93
26	80.0	2.6	78.2	4.4	.946	.17	1.51	.87
27	81.2	3.3	78.9	5.6	.967	.34	2.01	.84
28	80.1	3.2	77.9	4.5	.937	.06	1.87	.84
29	80.5	3.2	78.3	5.4	.949	.18	.89	.84
30	80.9	3.9	78.2	6.6	.946	.11	2.35	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.723	29.855	29.513	0.342	81.0	83.5	78.0	5.5
1	.712	.849	.494	.355	80.8	83.0	78.2	4.8
2	.700	.836	.479	.357	80.5	82.8	78.2	4.6
3	.688	.829	.467	.362	80.3	82.4	77.8	4.6
4	.682	.822	.461	.361	80.1	82.0	78.0	4.0
5	.694	.837	.469	.368	80.0	82.0	78.0	4.0
6	.709	.851	.479	.372	80.0	81.8	78.0	3.8
7	.727	.876	.501	.375	80.6	82.5	78.7	3.8
8	.745	.895	.517	.378	82.2	84.0	77.9	6.1
9	.756	.915	.534	.381	83.7	86.3	77.8	8.5
10	.754	.904	.535	.369	85.0	88.5	78.0	10.5
11	.745	.892	.525	.367	85.5	90.0	78.5	11.5
Neon.	.723	.864	.519	.345	86.2	89.6	78.5	11.1
1	.698	.836	.493	.343	86.2	91.7	78.8	12.9
2	.670	.821	.473	.348	86.6	90.5	78.5	12.0
3	.650	.802	.457	.345	86.5	90.8	78.5	12.3
4	.646	.811	.462	.349	85.8	90.5	78.7	11.8
5	.645	.811	.469	.342	84.4	89.6	79.0	10.6
6	.657	.803	.480	.323	83.4	87.5	78.9	8.6
7	.676	.817	.506	.311	82.6	86.0	78.2	7.8
8	.702	.844	.531	.313	82.2	85.0	78.5	6.5
9	.724	.856	.545	.311	81.8	84.3	78.0	6.3
10	.733	.874	.532	.342	81.6	84.0	78.1	5.9
11	.730	.862	.525	.337	81.2	83.5	78.0	5.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.5	1.5	78.4	2.6	.0952	10.25	0.89	0.92
1	79.5	1.3	78.6	2.2	.958	.34	.73	.93
2	79.3	1.2	78.5	2.0	.955	.31	.67	.94
3	79.1	1.2	78.3	2.0	.949	.24	.67	.94
4	79.0	1.1	78.2	1.9	.946	.21	.63	.94
5	79.0	1.0	78.3	1.7	.949	.24	.57	.95
6	79.0	1.0	78.3	1.7	.949	.24	.57	.95
7	79.4	1.2	78.6	2.0	.958	.34	.67	.94
8	80.1	2.1	78.6	3.6	.958	.30	1.24	.89
9	80.6	3.1	78.4	5.3	.952	.21	.86	.85
10	80.7	4.3	77.7	7.3	.931	9.96	2.57	.80
11	80.8	4.7	77.5	8.0	.925	.88	.84	.78
Noon.	81.0	5.2	77.4	8.8	.922	.83	3.16	.76
1	81.0	5.2	77.4	8.8	.922	.83	.16	.76
2	81.1	5.5	77.8	8.8	.934	.95	.19	.76
3	81.0	5.5	77.7	8.8	.931	.92	.18	.76
4	80.6	5.2	77.0	8.8	.910	.71	.12	.76
5	80.4	4.0	77.6	6.8	.928	.93	2.38	.81
6	80.2	3.2	78.0	5.4	.940	10.09	1.87	.84
7	79.9	2.7	78.0	4.6	.940	.09	.59	.86
8	79.8	2.4	78.1	4.1	.943	.14	.40	.88
9	79.7	2.1	78.2	3.6	.946	.17	.23	.89
10	79.6	2.0	78.2	3.4	.946	.19	.15	.90
11	79.5	1.7	78.3	2.9	.949	.22	0.99	.91

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	144.5	0.07	S & S by E	...	97.5	̑i to 8 A. M., ̑i to 7, B to 11 P. M. T at 4 P. M. Slight R between 4 & 5 P. M.
2	138.6	0.04	S by E & Variable	0.5	76.1	Chiefly ̑i & ̑i. T at 12½, 1 & 3 P. M. L at 12½ & 8 P. M. Light R at 1 P. M.
3	142.0	...	S by W & E	...	38.2	B to 5, S to 10 A. M. ̑i to 3. ̑i to 11 P. M. A smart shock of an earthquake at 9-17-22 A. M. Sheet L on W from 8 to 11 P. M.
4	133.0	0.11	S S E	1.0	168.5	S to 7 A. M., ̑i to 4, ̑i to 6, ̑i to 8, ̑i to 11 P. M. Sheet L on N at Midnight & 1 A. M. Slight R after intervals from 10 A. M. to 8 P. M.
5	...	2.14	S E & SSE	1.8	224.1	O. T between 9 & 10 A. M. R nearly the whole day.
6	129.3	0.97	S S E	...	155.4	O to 7 A. M., ̑i to 6, O to 9, B to 11 P. M. T & L at 3, 4 A. M. & 7½ P. M. R at 4, 5 A. M., 2½ & 6½ P. M.
7	143.5	0.16	S E & S S E	0.6	142.0	B to 3, Scuds to 8 A. M., ̑i to 5, ̑i & ̑i to 11 P. M. T at 1½ P. M. Slight R after intervals from 8½ A. M. to 5½ P. M.
8	143.7	0.09	E S E & S by E	1.3	208.6	B to 2, ̑i to 10 A. M., ̑i to 8, O to 11 P. M. Sheet L on NW at 11 P. M. Light R at 7½, 11½ A. M., 12, 2½ & 8½ P. M.
9	121.3	0.31	S	...	168.9	O to 2, ̑i to 11 P. M. R after intervals from Midnight to 11½ A. M.
10	120.0	0.02	S & S S E	0.8	168.0	Chiefly S. Sheet L on W at 10 P. M. Light R at 3½, 11 A. M. & 3 P. M.
11	149.0	...	S S E, E S E & S [by W	...	114.0	B to 2, S to 8 A. M., ̑i to 5, ̑i to 11 P. M.

̑i Cirri, —i Strati, ̑i Cumuli, ̑i Cirro-strati, ̑i Cumulo-strati, ̑i Nimbi, ̑i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of September 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity	
	°	Inches		lb	Miles.	
12	147.8	...	S by W & S	...	62.7	B to 7 A. M., $\curvearrowright$ i to 7, $\searrow$ i to 11 to P. M. T at 2 P. M. D between 6 & 7½ P. M.
13	146.0	...	S S E & E S E	...	76.3	S to 8 A. M., $\searrow$ i to 12, $\curvearrowright$ i to 9, $\searrow$ i to 11 P. M. D at 7½ P. M.
14	140.2	0.04	E & S E	1.0	109.5	$\searrow$ i to 8 A. M., $\curvearrowright$ i to 4, S to 8, $\searrow$ i to 11 P. M. T between 2½ & 4 P. M. L at 3½ P. M. Light R at 3½ & 5 P. M.
15	145.0	0.02	E	5.0	155.1	$\searrow$ i to 5, O to 7 A. M., $\searrow$ i to 3, S to 11 P. M. T at 3 & 4½ P. M. Sheet L between 6 & 7 P. M. Light R at 4½ P. M.
16	138.5	0.07	E, E S E & S E	1.0	211.0	$\searrow$ i to 7 A. M., $\curvearrowright$ i to 4, $\searrow$ i to 11 P. M. Slight R at 4½ A. M.
17	...	0.21	E & E S E	0.8	265.3	$\searrow$ i to 5 A. M., O to 6, $\searrow$ i to 11 P. M. Slight R from 7 A. M. to 2 P. M.
18	123.0	0.56	E by S & S E	2.6	171.9	$\searrow$ i to 7 A. M., O to 11 P. M. T at 1½, 2 & 4 P. M. R at 10 A. M. & from 12½ to 6 P. M.
19	141.0	0.64	S S E & S	...	95.2	S to 1, $\searrow$ i to 7 A. M., $\searrow$ i to 12, O to 4, $\searrow$ i to 6, B to 11 P. M. T at 12½ & 1 P. M. R from 12½ to 5 P. M.
20	149.0	...	S & S S W	...	68.7	B to 4, $\searrow$ i to 9 A. M., $\curvearrowright$ i to 6, B to 11 P. M.
21	152.2	...	S by W & S S W	...	96.1	B to 3, $\searrow$ i to 7 A. M., $\curvearrowright$ i to 4, $\searrow$ i to 6, B to 11 P. M. Sheet L between 6 & 7 P. M.
22	148.2	...	S S W	...	109.3	$\searrow$ i to 7 A. M., $\curvearrowright$ i to 4, $\searrow$ i to 11 to P. M. Sheet L at 8½ & 10 P. M.
23	152.0	...	S S W & S	...	128.9	$\searrow$ i to 7 A. M., $\curvearrowright$ i to 7, B to 11 P. M. T & L between 5 & 6 P. M. D at 6½ P. M.

$\searrow$  i Cirri,—i Strati,  $\curvearrowright$  i Cumuli,  $\searrow$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches.		lb	Miles.	
24	133.5	1.05	S S W & Variable	...	133.0	~i to 1. O to 3, ~i to 7 A. M., ~i to 12, O to 11 P. M. T from Midnight to 3 A. M. & 12½ to 2 P. M. L from Midnight to 3 A. M. & at 6½ P. M. R from 1½ to 3 & 10½ A. M. to 3 P. M.
25	113.0	0.09	S S W	...	48.6	S to 2, O to 6 A. M., ~i to 12, O to 3, ~i to 6, B to 11 P. M. T at 4 & from 9½ A. M. to 1 P. M. Sheet L at Midnight, 1 A. M. S & 11 P. M. Slight R at 4, 11 A. M., 1 & 2 P. M.
26	139.0	0.04	S by W & S W	...	59.4	~i to 1, B to 5 A. M., ~i to 6, O to 11 P. M. T from 5 to 7 P. M. L at Midnight 1 A. M., 7, 8 & 11½ P. M. Light R at 12, 1, 4½ & 7 P. M.
27	146.0	0.02	S W & S by W	...	67.0	B to 3 A. M., ~i to 7, ~i & ~i to 11 P. M. T at 4, 5 A. M. & 5½ P. M. L at 4, 5 A. M. & 7 P. M. Light R at 5 & 6 A. M.
28	141.2	0.74	S W & S S W	...	113.8	S to 1, ~i to 9 A. M., ~i to 3, O to 11 P. M. T at 3½, 4½ & 5½ P. M. L from Midnight to 5 A. M. & 8 to 11 P. M. R from 5 to 8 P. M.
29	135.6	0.02	S S W & S	...	58.7	S to 2, ~i to 7 A. M., ~i to 6, B to 11 P. M. Sheet L from 7 to 9 P. M. T & Light R at Noon.
30	146.0	...	S W & Variable	...	66.4	~i to 7 A. M., ~i to 7, B to 11 P. M.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimb,  
~i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R rain, D. drizzle.

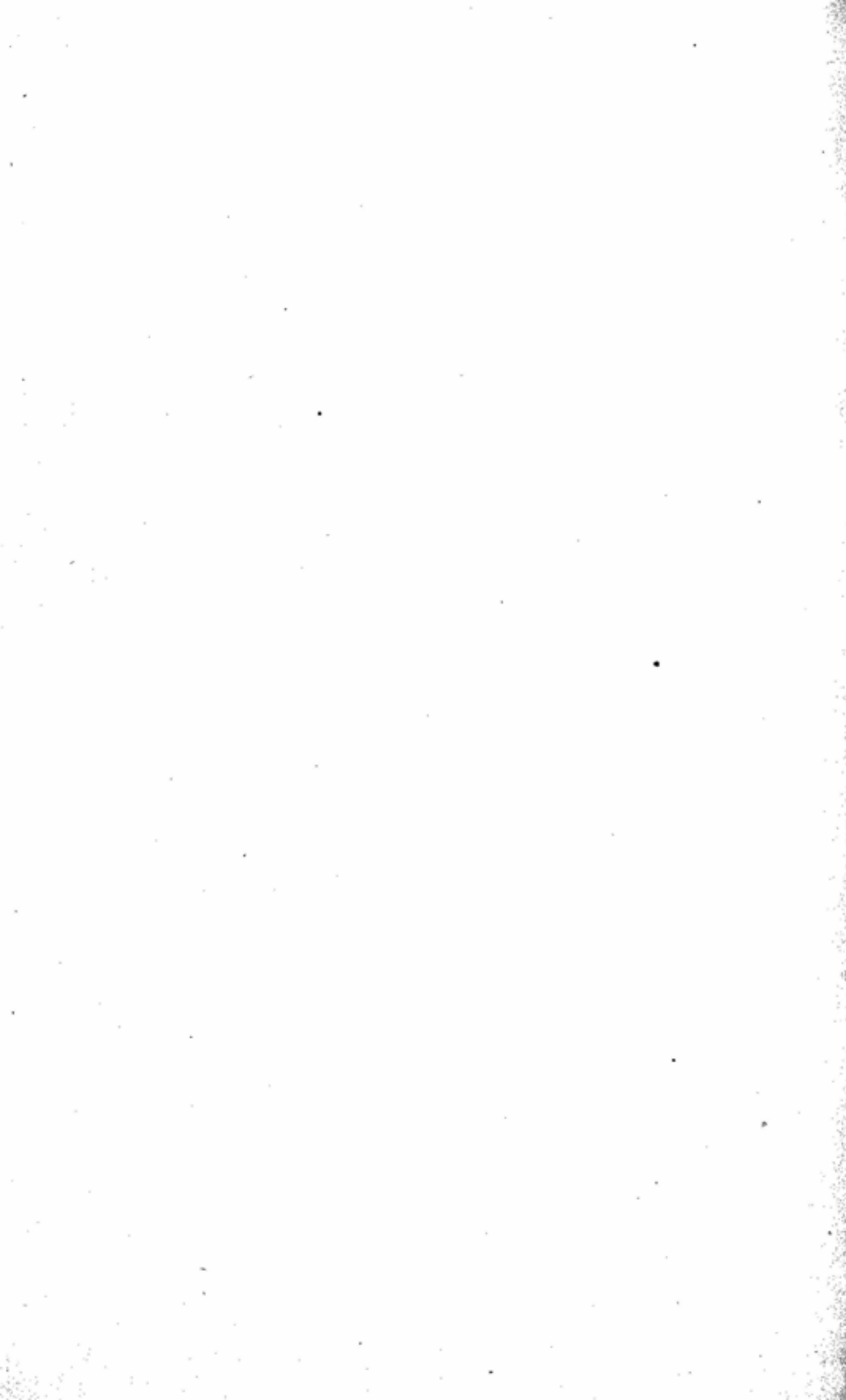
*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

## MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.704
Max. height of the Barometer occurred at 9 A. M. on the 22nd ...	29.915
Min. height of the Barometer occurred at 3 P. M. on the 9th ...	29.457
Extreme range of the Barometer during the month ...	0.458
Mean of the daily Max. Pressures ... ..	29.765
Ditto ditto Min. ditto ... ..	29.635
Mean daily range of the Barometer during the month ...	0.130
<hr/>	
Mean Dry Bulb Thermometer for the month ... ..	82.8
Max. Temperature occurred at 1 P. M. on the 12th ...	91.7
Min. Temperature occurred at 3 & 9 A. M. on the 9th & 17th ...	77.8
Extreme range of the Temperature during the month ...	13.9
Mean of the daily Max. Temperature ... ..	87.9
Ditto ditto Min. ditto, ... ..	79.7
Mean daily range of the Temperature during the month ...	8.2
<hr/>	
Mean Wet Bulb Thermometer for the month ... ..	80.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.8
Computed Mean Dew-point for the month ... ..	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.8
<hr/>	
Mean Elastic force of Vapour for the month ... ..	0.940
<hr/>	
	Troy grain.
Mean Weight of Vapour for the month ... ..	10.09
Additional Weight of Vapour required for complete saturation ...	1.66
Mean degree of humidity for the month, complete saturation being unity	0.86
<hr/>	
Mean Max. Solar radiation Thermometer for the month ... ..	139.4
<hr/>	
	Inches.
Rained 24 days,—Max. fall of rain during 24 hours ... ..	2.14
Total amount of rain during the month ... ..	7.41
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	6.86
Prevailing direction of the Wind ... S, S, S, W. & S, S, E.	

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.683	29.729	29.637	0.092	86.5	91.8	82.2	9.6
2	.708	.751	.661	.090	84.8	90.0	81.8	8.2
3	.740	.785	.685	.100	85.4	91.5	79.5	12.0
4	.766	.822	.712	.110	84.6	88.0	81.0	7.0
5	.763	.815	.707	.108	83.8	88.0	81.0	7.0
6	.784	.842	.740	.102	83.9	89.2	79.5	9.7
7	.816	.876	.763	.113	83.4	89.6	77.0	12.6
8	.816	.870	.752	.118	83.6	89.0	78.7	10.3
9	.836	.896	.791	.105	83.0	89.3	77.5	11.8
10	.885	.942	.835	.107	81.2	86.5	75.5	11.0
11	.896	.961	.850	.111	79.2	86.2	73.0	13.2
12	.816	.890	.746	.144	79.3	85.6	73.0	12.6
13	.780	.833	.728	.105	81.2	87.4	76.0	11.4
14	.826	.881	.786	.095	81.7	88.5	74.5	14.0
15	.866	.931	.818	.113	79.6	84.5	76.5	8.0
16	.850	.920	.814	.106	76.0	77.8	74.7	3.1
17	.813	.899	.790	.109	79.5	86.5	75.0	11.5
18	.843	.896	.782	.114	82.3	88.9	77.0	11.9
19	.820	.876	.766	.110	82.0	86.5	78.5	8.0
20	.854	.910	.803	.107	81.2	88.0	78.2	9.8
21	.910	.976	.855	.121	82.1	87.4	79.0	8.4
22	.902	.961	.845	.116	79.8	84.5	77.9	6.6
23	.892	.953	.844	.109	74.8	77.5	73.0	4.5
24	.881	.961	.811	.150	77.1	82.5	73.0	9.5
25	.858	.930	.785	.145	79.8	85.5	74.8	10.7
26	.864	.937	.804	.133	79.8	86.4	73.5	12.9
27	.866	.944	.804	.140	80.9	87.6	75.0	12.6
28	.844	.928	.796	.132	81.1	87.5	74.3	13.2
29	.824	.905	.776	.129	81.2	87.5	76.5	11.0
30	.848	.931	.797	.134	80.8	87.7	75.0	12.7
31	.866	.947	.816	.131	79.2	86.1	73.0	13.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.8	5.7	77.4	9.1	0.922	9.83	3.27	0.75
2	80.6	4.2	77.7	7.1	.931	.96	2.50	.80
3	79.9	5.5	76.0	9.4	.882	.43	3.25	.74
4	80.5	4.1	77.6	7.0	.928	.93	2.46	.80
5	80.1	3.7	77.5	6.3	.925	.92	.18	.82
6	76.7	7.2	71.7	12.2	.768	8.23	3.90	.68
7	76.7	6.7	72.0	11.4	.776	.31	.65	.70
8	76.9	6.7	72.2	11.4	.781	.36	.67	.70
9	76.2	6.8	71.4	11.6	.761	.15	.67	.69
10	72.6	8.6	66.6	14.6	.651	6.99	4.22	.62
11	70.0	9.2	63.6	15.6	.590	.36	.20	.60
12	72.4	6.9	67.6	11.7	.672	7.26	3.33	.69
13	73.1	8.1	67.4	13.8	.668	.18	4.03	.64
14	73.3	8.4	67.4	14.3	.668	.18	.19	.63
15	75.8	3.8	73.1	6.5	.803	8.67	2.02	.81
16	74.8	1.2	74.0	2.0	.827	9.00	0.60	.94
17	77.0	2.5	75.2	4.3	.860	.30	1.36	.87
18	78.1	4.2	75.2	7.1	.860	.24	2.34	.80
19	78.5	3.5	76.0	6.0	.882	.48	1.99	.83
20	78.6	2.6	76.8	4.4	.905	.75	.46	.87
21	78.3	3.8	75.6	6.5	.871	.35	2.16	.81
22	75.4	4.4	72.3	7.5	.783	8.44	.31	.79
23	72.6	2.2	71.1	3.7	.753	.21	1.05	.89
24	74.4	2.7	72.5	4.6	.787	.54	.38	.86
25	75.2	4.6	72.0	7.8	.776	.36	2.39	.78
26	74.5	5.3	70.8	9.0	.746	.05	.70	.75
27	75.0	5.9	70.9	10.0	.748	.07	3.03	.73
28	75.1	6.0	70.9	10.2	.748	.07	.10	.72
29	74.3	6.9	69.5	11.7	.715	7.69	.52	.69
30	74.3	6.5	69.7	11.1	.720	.76	.31	.70
31	71.3	7.9	65.8	13.4	.634	6.86	.70	.65

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.832	29.914	29.685	0.229	79.0	84.0	74.1	9.9
1	.822	.910	.677	.233	78.6	83.5	74.0	9.5
2	.814	.906	.670	.236	78.2	82.8	73.8	9.0
3	.807	.893	.660	.233	77.8	82.6	73.6	9.0
4	.807	.897	.646	.251	77.4	82.6	73.5	9.1
5	.820	.906	.662	.244	77.1	82.5	73.2	9.3
6	.837	.925	.682	.243	76.8	82.2	73.0	9.2
7	.857	.951	.699	.252	77.3	83.2	73.0	10.2
8	.879	.972	.724	.248	79.4	85.5	73.5	12.0
9	.891	.975	.729	.246	81.9	87.5	73.7	13.8
10	.890	.976	.729	.247	83.6	89.2	74.8	14.4
11	.875	.958	.721	.237	84.8	90.5	75.1	15.4
Noon.	.849	.932	.705	.227	85.3	91.5	75.0	16.5
1	.825	.910	.679	.231	86.0	91.2	75.0	16.2
2	.801	.878	.665	.213	86.1	91.3	74.7	16.6
3	.785	.869	.641	.228	86.1	91.8	74.7	17.1
4	.781	.864	.637	.227	85.6	91.5	74.7	16.8
5	.785	.877	.639	.238	84.6	90.5	74.5	16.0
6	.795	.890	.660	.230	82.8	88.0	74.0	14.0
7	.810	.898	.671	.227	81.7	87.0	73.8	13.2
8	.831	.907	.694	.213	80.9	86.0	74.0	12.0
9	.844	.927	.702	.225	80.3	85.5	73.9	11.6
10	.850	.934	.708	.226	79.8	85.0	73.8	11.2
11	.844	.922	.714	.208	79.2	84.4	73.8	10.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	76.5	2.5	74.7	4.3	0.846	9.16	1.34	0.87
1	76.1	2.5	74.3	4.3	.835	.05	.33	.87
2	75.8	2.4	74.1	4.1	.830	.00	.25	.88
3	75.5	2.3	73.9	3.9	.824	8.94	.19	.88
4	75.2	2.2	73.7	3.7	.819	.89	.12	.89
5	74.9	2.2	73.4	3.7	.811	.80	.12	.89
6	74.6	2.2	73.1	3.7	.803	.72	.11	.89
7	74.8	2.5	73.0	4.3	.801	.69	.29	.87
8	75.0	4.4	71.9	7.5	.773	.34	2.28	.79
9	75.3	6.6	70.7	11.2	.744	.00	3.44	.70
10	75.6	8.0	70.0	13.6	.727	7.78	4.25	.65
11	75.8	9.0	69.5	15.3	.715	.64	.82	.61
Noon.	75.9	9.4	69.3	16.0	.711	.58	5.06	.60
1	75.9	10.1	68.8	17.2	.699	.45	.46	.58
2	76.0	10.1	68.9	17.2	.701	.48	.47	.58
3	75.8	10.3	68.6	17.5	.695	.39	.56	.57
4	75.8	9.8	68.9	16.7	.701	.48	.28	.57
5	76.3	8.3	70.5	14.1	.739	.90	4.49	.64
6	77.0	5.8	72.9	9.9	.797	8.56	3.19	.73
7	77.1	4.6	73.9	7.8	.824	.87	2.50	.78
8	76.9	4.0	74.1	6.8	.830	.94	.16	.80
9	76.8	3.5	74.3	6.0	.835	9.01	1.90	.83
10	76.6	3.2	74.4	5.4	.838	.06	.69	.84
11	76.4	2.8	74.4	4.8	.838	.06	.50	.86

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	149.9	...	N & W N W	...	98.9	B to 2, \i to 7, \i to 9 A. M., \i to 4, \i to 6, B to 11 P. M.
2	138.0	0.07	W & S S W	...	74.6	B to 3, \i to 5, \i to 7, B to 9 A. M., \i to 4, \i to 6, B to 11 P. M. Light R at 12 & 4½ P. M.
3	144.0	...	S E & E N E	...	64.6	B to 5, \i to 8, B to 11 A. M., \i to 5, \i to 11 P. M.
4	118.0	...	S S W	...	69.2	S to 10 A. M., O to 8, S to 11 P. M. D at Noon.
5	112.0	...	S by W & N W	...	57.8	S to 5 A. M., \i to 12, O to 2, S to 5, B to 11 P. M. T at 11½ A. M.
6	141.7	...	S by W & N by W	...	119.3	B to 3 A. M., \i to 4, \i to 9, O to 11 P. M.
7	146.6	...	N by W, E & N	...	113.3	B to 6, \i to 9 A. M., \i & \i to 11 P. M.
8	146.8	...	N N W & W by	...	63.8	\i to 2, \i to 5, \i to 7, B to 10 A. M., \i to 6, B to 8, \i to 11 P. M.
9	148.8	...	W S W & N N W	...	104.6	B to 6, \i to 9, B to 11 A. M., \i to 5, B to 9, \i to 11 P. M.
10	144.0	...	N N E & N W	...	122.0	\i to 2 A. M., B to 11 P. M.
11	145.0	...	N W	...	99.0	B.
12	149.0	...	S W	...	80.2	\i to 3, \i to 7, \i to 11 A. M., \i to 3, \i to 11 P. M.
13	145.0	...	N N W & N W	...	125.3	\i to 4, \i to 7, B to 11 A. M., \i to 5, \i to 11 P. M.
14	147.5	...	N N W & N	...	145.5	\i to 7, B to 11 A. M., \i to 6, \i to 11 P. M.
15	140.0	0.45	S E, E & N E	...	99.9	B to 5, \i to 8 A. M., O to 12, \i to 11 P. M. Sheet L at 5 P. M. R at 11½ A. M., 4 & 10 P. M.
16	...	2.22	N E & E S E	...	174.4	O to 5, \i to 11 P. M. Sheet. L at 1 & 5 A. M. R from 2 A. M to 4 P. M.
17	148.0	0.06	E	...	146.2	\i & \i to 3 A. M., \i to 4, \i to 8, \i to 11 P. M. Light R at 5½ & 7 A. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning.  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of October 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
18	140.8	...	E by N & S S W [by S	...	77.0	↘i to 8 A. M., ↗i to 6, B to 11 P. M.
19	127.0	...	S S W, S W & W	...	55.1	B to 1, ↘i to 9 A. M., ↗i to 3, ↘i to 11 P. M. Slightly foggy at 7 & 8 P. M.
20	138.0	0.26	W S W & E	...	56.1	↘i to 8 A. M., ↗i & ↘i to 1, O to 7, B to 9, S to 11 P. M. T at 2 P. M. Slight R at 10½ A. M. & between 2 & 3 P. M.
21	134.5	...	E by N & E	...	90.4	O to 1 A. M., ↘i to 5, O to 11 P. M.
22	135.0	...	E, E by N & E N E	...	111.1	O to 1, ↘i to 6, O 11 P. M.
23	...	0.11	N E & E N E	...	142.8	O. Light R nearly the whole day.
24	135.0	*0.25	E, N E & W N W	...	112.2	O to 8 A. M., ↘i to 6, S to 11 P. M. Light R at 2, 2½ & 4 A. M.
25	140.8	...	N by E & N W	...	79.3	S to 1, ↘i to 3, B to 10 A. M., ↗i to 5, B to 11 P. M.
26	138.0	...	N W & S S W	...	68.5	B to 10 A. M., ↗i to 4, B to 11 P. M.
27	139.5	...	S W & N W	...	92.0	B to 11 A. M., ↘i to 3, B to 11 P. M. Slightly foggy from 7 to 10 P. M.
28	141.8	...	N W, W & W S W	...	70.8	B to 12, ↘i to 6, S to 11 P. M.
29	140.0	...	W S W & N	...	97.7	B to 12, ↘i to 6, S to 11 P. M.
30	139.0	...	N by W & N by E	...	85.5	B to 12, ↘i to 4, B to 11 P. M.
31	138.5	...	E by N & W by N	...	75.5	B to 12, ↗i to 4, B to 11 P. M. B.

\* Fell since 4 P. M. of the 23rd to 4 A. M. of the 24th.

↘i Cirri,—i Strati, ↗i Cumuli, ↘i Cirro-strati, ~i Cumulo-strati, ↘i Nimbi, ↘i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.830
Max. height of the Barometer occurred at 10 A. M. on the 21st	29.976
Min. height of the Barometer occurred at 4 P. M. on the 1st	29.637
Extreme range of the Barometer during the month ... ..	0.339
Mean of the daily Max. Pressures ... ..	29.893
Ditto ditto Min. ditto ... ..	29.777
Mean daily range of the Barometer during the month ... ..	0.116

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	°
Mean Dry Bulb Thermometer for the month ... ..	81.3
Max. Temperature occurred at 3 P. M. on the 1st	91.8
Min. Temperature occurred at 6 & 7 A. M. on the 11, 12, 23rd, 24th & 31st	73.0
Extreme range of the Temperature during the month ... ..	18.8
Mean of the daily Max. Temperature ... ..	86.9
Ditto ditto Min. ditto, ... ..	76.6
Mean daily range of the Temperature during the month ... ..	10.3

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Mean Wet Bulb Thermometer for the month ... ..	75.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	5.4
Computed Mean Dew-point for the month ... ..	72.1
Mean Dry Bulb Thermometer above computed mean Dew-point	9.2

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.778

---

	Troy grain.
Mean Weight of Vapour for the month ... ..	8.38
Additional Weight of Vapour required for complete saturation	2.86
Mean degree of humidity for the month, complete saturation being unity	0.75

	°
Mean Max. Solar radiation Thermometer for the month ... ..	139.7

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	Inches.
Rained 9 days,—Max. fall of rain during 24 hours ... ..	2.22
Total amount of rain during the month ... ..	3.42
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	3.08
Prevailing direction of the Wind ... .. N. W, S, S, W. & E.	

\* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month Oct. of 1875.*

### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.908	29.980	29.868	0.112	76.9	85.0	70.0	15.0
2	.935	30.003	.887	.116	75.7	83.8	69.0	14.8
3	.922	29.986	.867	.119	76.8	84.8	69.5	15.3
4	.929	.985	.884	.101	77.9	85.8	72.5	13.3
5	.985	30.055	.938	.117	76.7	85.0	70.0	15.0
6	.983	.060	.915	.145	77.5	86.0	70.6	15.4
7	.961	.030	.906	.124	77.0	84.5	71.2	13.3
8	.938	.009	.890	.119	76.3	84.0	69.0	15.0
9	.966	.037	.921	.116	75.7	83.5	68.5	15.0
10	.999	.074	.953	.121	75.0	83.5	68.0	15.5
11	.999	.071	.947	.124	75.6	83.0	69.0	14.0
12	30.023	.100	.964	.136	75.5	83.3	69.0	14.3
13	.080	.149	30.027	.122	75.9	84.4	68.6	15.8
14	.063	.140	.008	.132	75.3	83.2	68.4	14.8
15	.086	.093	29.993	.100	74.4	81.6	68.0	13.6
16	.060	.121	30.005	.116	73.9	82.2	66.5	15.7
17	.075	.149	.023	.126	72.9	82.6	64.5	18.1
18	.022	.103	29.967	.136	72.2	81.5	64.3	17.2
19	29.983	.066	.929	.137	71.6	80.5	63.6	16.9
20	.964	.032	.909	.123	71.3	79.9	64.0	15.9
21	.957	.030	.900	.130	71.5	79.2	65.3	13.9
22	.975	.057	.914	.143	71.5	79.5	65.0	14.5
23	.973	.054	.912	.142	70.5	79.9	61.5	18.4
24	.984	.067	.913	.154	69.0	78.0	61.3	16.7
25	.981	.058	.927	.131	69.6	79.5	61.8	17.7
26	.990	.052	.939	.113	69.7	79.0	61.6	17.4
27	30.009	.090	.951	.139	70.1	79.5	62.0	17.5
28	29.988	.061	.923	.138	70.6	80.5	62.6	17.9
29	.977	.055	.921	.134	71.0	80.2	63.2	17.0
30	.971	.045	.910	.135	72.5	81.5	65.0	16.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	68.9	8.0	63.3	13.6	.0584	6.33	3.53	.64
2	68.4	7.3	63.3	12.4	.584	.35	.16	.67
3	70.5	6.3	66.1	10.7	.640	.94	2.89	.71
4	71.3	6.6	66.7	11.2	.653	7.07	3.09	.70
5	70.7	6.0	66.5	10.2	.648	.05	2.75	.72
6	70.5	7.0	65.6	11.9	.630	6.83	3.21	.68
7	69.7	7.3	64.6	12.4	.609	.62	.27	.67
8	68.6	7.7	63.2	13.1	.582	.32	.37	.65
9	68.2	7.5	62.9	12.8	.576	.26	.25	.66
10	68.1	6.9	63.3	11.7	.584	.35	2.96	.68
11	68.6	7.0	63.7	11.9	.591	.43	3.05	.68
12	68.9	6.6	64.3	11.2	.603	.57	2.89	.70
13	69.4	6.5	64.8	11.1	.613	.68	.89	.70
14	69.2	6.1	64.9	10.4	.615	.71	.69	.71
15	67.8	6.6	63.2	11.2	.582	.35	.80	.69
16	67.0	6.9	62.2	11.7	.563	.14	.87	.68
17	65.8	7.1	60.1	12.8	.525	5.74	.99	.66
18	65.1	7.1	59.4	12.8	.513	.61	.94	.66
19	64.4	7.2	58.6	13.0	.499	.47	.93	.65
20	64.4	6.9	58.9	12.4	.504	.53	.80	.66
21	65.6	5.9	60.9	10.6	.539	.91	.47	.70
22	65.0	6.5	59.8	11.7	.520	.69	.69	.68
23	62.2	8.3	55.6	14.9	.452	4.97	3.16	.61
24	61.6	7.4	55.7	13.3	.453	5.00	2.76	.64
25	62.6	7.0	57.0	12.6	.473	.20	.70	.66
26	62.7	7.0	57.1	12.6	.475	.22	.71	.66
27	63.4	6.7	58.0	12.1	.489	.38	.65	.67
28	64.5	6.1	59.6	11.0	.516	.67	.48	.70
29	65.0	6.0	60.2	10.8	.527	.78	.47	.70
30	67.1	5.4	62.8	9.7	.574	6.28	.35	.73

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.985	30.087	29.872	0.215	70.0	75.2	64.5	10.7
1	.977	.084	.868	.216	69.4	74.8	64.1	10.7
2	.968	.072	.869	.203	68.8	74.0	63.7	10.3
3	.959	.061	.873	.188	68.2	73.3	63.0	10.3
4	.963	.061	.881	.180	67.6	73.0	62.0	11.0
5	.978	.084	.896	.188	67.1	72.8	61.8	11.0
6	.997	.108	.911	.197	66.5	72.5	61.5	11.0
7	30.018	.121	.930	.191	66.7	73.0	61.3	11.7
8	.041	.140	.958	.182	69.6	75.0	63.4	11.6
9	.058	.149	.976	.173	73.8	79.0	68.3	10.7
10	.058	.149	.980	.169	77.0	81.0	70.8	10.2
11	.036	.129	.956	.173	79.3	82.8	74.0	8.8
•								
Noon.	.008	.097	.928	.169	80.6	84.9	76.8	8.1
1	29.976	.068	.902	.166	81.5	85.0	77.4	7.6
2	.952	.044	.883	.161	82.1	85.5	78.0	7.5
3	.939	.035	.869	.166	82.0	86.0	77.5	8.5
4	.937	.027	.867	.160	80.6	84.5	76.5	8.0
5	.943	.041	.877	.164	79.0	83.0	75.0	8.0
6	.954	.049	.886	.163	76.3	80.3	72.5	7.8
7	.970	.062	.902	.160	74.6	79.0	70.0	9.0
8	.989	.081	.917	.164	73.3	77.8	68.7	9.1
9	.999	.097	.924	.173	72.3	76.7	67.8	8.9
10	30.005	.106	.930	.176	71.3	75.9	66.7	9.2
11	29.999	.093	.927	.166	70.4	75.3	65.4	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	66.5	3.5	63.7	6.3	.0591	6.51	1.49	0.81
1	65.9	3.5	63.1	6.3	.580	.39	.47	.81
2	65.4	3.4	62.7	6.1	.572	.31	.40	.82
3	64.9	3.3	62.3	5.9	.565	.23	.35	.82
4	64.4	3.2	61.8	5.8	.555	.14	.30	.83
5	64.0	3.1	61.5	5.6	.550	.09	.23	.83
6	63.6	2.9	61.3	5.2	.546	.06	.13	.84
7	63.8	2.9	61.5	5.2	.550	.10	.13	.84
8	65.2	4.4	61.7	7.9	.554	.09	.81	.77
9	66.8	7.0	61.9	11.9	.557	.08	2.90	.68
10	67.7	9.3	61.2	15.8	.544	5.90	3.99	.60
11	68.2	11.1	60.4	18.9	.530	.72	4.87	.54
Noon.	68.2	12.4	59.5	21.1	.515	.54	5.47	.50
1	68.2	13.3	58.9	22.6	.504	.41	.90	.48
2	68.0	14.1	58.1	24.0	.491	.26	6.25	.46
3	68.2	13.8	58.5	23.5	.498	.33	.14	.47
4	67.9	12.7	59.0	21.6	.506	.44	5.57	.49
5	69.1	9.9	62.2	16.8	.563	6.08	4.42	.58
6	69.4	6.9	64.6	11.7	.609	.62	3.07	.68
7	68.9	5.7	64.9	9.7	.615	.71	2.49	.73
8	68.3	5.0	64.3	9.0	.603	.60	.24	.75
9	67.8	4.5	64.2	8.1	.601	.58	.00	.77
10	67.2	4.1	63.9	7.4	.595	.54	1.79	.79
11	66.6	3.8	63.6	6.8	.590	.48	.62	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1 <sup>st</sup> ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches			Miles.	
1	141.0	...	W by N, N W &	...	84.5	B.
2	141.2	...	W N W & W	...	89.5	B.
3	137.4	...	S W & S by W	...	64.6	B.
4	139.2	...	W S W, W & S W	...	95.2	B.
5	130.0	...	S E & S S W	...	57.4	B. Slightly foggy at 6 & 7 A.M.
6	137.0	...	S W & W N W	...	79.2	B to 3, \i to 5, B to 9, \i to 11 P. M. Slightly foggy at 9 & 10 P. M.
7	137.7	...	W, N W, & W by S	...	110.0	B to 4, \i to 10 A. M., \i to 3, \i to 8, B to 11 P. M.
8	143.0	...	W & W by S	...	122.7	B to 1, \i to 4, B to 11 P. M.
9	137.5	...	W, N W & S W	...	88.9	B to 11 A. M., \i to 3, B to 11 P. M.
10	141.5	...	S by E & S W	...	68.6	B. Slightly foggy from Midnight, to 2 A. M.
11	140.0	...	S W & W N W	...	89.0	B.
12	142.0	...	W by N & S W	...	76.1	B. Slightly foggy at Midnight
13	140.0	...	S W & N N W	...	68.8	1 A. M., 8 & 9 P. M.
14	147.0	...	N by E & W by S	...	70.0	B
15	139.0	...	N by W & S S W	...	74.1	B to 10 A. M., \i to 3, B to 11 P. M.
16	140.0	...	S W & W	...	71.7	\i to 6, B to 11 P. M.
17	137.5	...	W & N N W	...	55.3	B. Slightly foggy at 7, 8 & 11 P. M.
18	134.4	...	N N W & N	...	94.3	B. Slightly foggy from Midnight to 2 A. M.
19	134.6	...	N, NNE & N by E	...	112.6	B.
20	131.0	...	N N W	...	92.4	B to 5 A. M., \i to 7, B to 11 P. M. Slightly foggy at 8 & 9 P. M.
21	127.5	...	N N W & W N W	...	82.0	\i to 8, B to 11 A. M., \i to 2, \i to 6, B to 11 P. M. Slightly foggy at 11 P. M.
22	130.0	...	N N W & W by N	...	95.8	B to 6 A. M., \i to 6, B to 11 P. M. Slightly foggy from 8 to 10 P. M.
						B to 3 A. M., \i to 6, B to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
23	136.0	...	N	...	119.8	B.
24	140.0	...	N by W	...	90.1	B.
25	138.0	...	N by E & N	...	109.2	B. Foggy from 8 to 10 p. m.
26	130.2	...	N & N W	...	83.7	B. Slightly foggy at Mid-night, 1 a. m. & 11 p. m.
27	133.2	...	N W & W by S	...	58.5	B. Foggy from 8 to 11 p. m.
28	133.0	...	S W, S & W N W	...	39.7	B. Slightly foggy from Mid-night to 6 a. m. & at 11 p. m.
29	139.5	...	W N W & W S W	...	49.5	B. Slightly foggy from Mid-night to 8 a. m. & at 8 & 9 p. m.
30	129.7	...	S S E & N W	...	48.5	B to 11 a. m., ~i to 4, B to 11 p. m. Foggy at 10 p. m.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.988
Max. height of the Barometer occurred at 9 & 10 A.M. on the 13th & 17th	30.149
Min. height of the Barometer occurred at 4 P.M. on the 3rd	29.867
Extreme range of the Barometer during the month	0.282
Mean of the daily Max. Pressures ... ..	30.060
Ditto ditto Min. ditto ... ..	29.934
Mean daily range of the Barometer during the month	0.126

	°
Mean Dry Bulb Thermometer for the month ... ..	73.7
Max. Temperature occurred at 3 P.M. on the 6th	86.0
Min. Temperature occurred at 7 A.M. on the 24th	61.3
Extreme range of the Temperature during the month	24.7
Mean of the daily Max. Temperature ... ..	82.2
Ditto ditto Min. ditto, ... ..	66.5
Mean daily range of the Temperature during the month	15.7

Mean Wet Bulb Thermometer for the month ... ..	66.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.9
Computed Mean Dew-point for the month ... ..	62.0
Mean Dry Bulb Thermometer above computed mean Dew-point	11.7

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.559

	Troy grain.
Mean Weight of Vapour for the month ... ..	6.10
Additional Weight of Vapour required for complete saturation	2.86
Mean degree of humidity for the month, complete saturation being unity	0.68

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.9

	Inches.
Rained no days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... .. W, N. W. & S W.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.951	30.029	29.882	0.147	73.3	83.0	65.4	17.6
2	.949	.022	.897	.125	73.9	83.4	66.4	17.0
3	.937	.026	.872	.154	74.3	84.2	66.8	17.4
4	.926	.006	.877	.129	73.9	83.0	66.0	17.0
5	.921	29.986	.867	.119	73.5	80.7	68.5	12.2
6	.996	30.061	.936	.125	73.4	81.0	68.4	12.6
7	30.037	.112	.977	.135	70.5	78.8	63.5	15.3
8	.051	.120	30.001	.119	70.0	79.0	63.2	15.8
9	.078	.170	.001	.169	68.6	76.2	60.0	16.2
10	.033	.124	29.963	.161	70.2	80.0	61.3	18.7
11	.011	.084	.953	.131	69.5	78.5	62.7	15.8
12	29.998	.064	.949	.115	68.5	77.5	61.6	15.9
13	30.035	.129	.981	.148	69.1	79.0	61.4	17.6
14	.023	.103	.962	.141	69.5	79.5	61.5	18.0
15	29.989	.063	.934	.129	68.4	77.2	62.8	14.4
16	.998	.082	.955	.127	68.1	78.0	60.3	17.7
17	30.029	.104	.978	.126	67.5	76.9	60.0	16.9
18	.051	.123	.992	.131	66.6	75.5	59.0	16.5
19	.036	.112	.962	.150	65.9	76.5	57.3	19.2
20	.059	.132	30.006	.126	67.7	76.0	60.0	16.0
21	.043	.136	29.976	.160	67.3	76.8	59.5	17.3
22	.020	.078	.973	.105	67.8	78.0	59.5	18.5
23	.089	.154	30.024	.130	67.3	76.5	59.5	17.0
24	.112	.185	.056	.129	66.6	75.5	58.7	16.8
25	.059	.136	29.977	.159	66.3	76.4	58.5	17.9
26	.018	.079	.958	.121	66.7	75.5	59.0	16.5
27	29.995	.073	.925	.148	66.3	75.5	58.5	17.0
28	.992	.080	.938	.142	67.5	77.5	59.5	18.0
29	30.000	.054	.961	.093	67.7	78.0	59.3	18.7
30	.053	.128	30.000	.128	68.0	78.5	59.5	19
31	.033	.101	29.982	.119	67.4	77.0	59.0	"

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	67.1	6.2	62.1	11.2	.0561	6.13	2.71	0.69
2	68.0	5.9	63.9	10.0	.595	.50	.51	.72
3	67.4	6.9	62.6	11.7	.570	.22	.90	.68
4	67.5	6.4	63.0	10.9	.578	.31	.70	.70
5	67.8	5.7	63.8	9.7	.593	.48	.42	.73
6	66.9	6.5	61.7	11.7	.554	.04	.83	.68
7	63.2	7.3	57.4	13.1	.480	5.27	.86	.66
8	64.0	6.0	59.2	10.8	.509	.60	.40	.70
9	61.3	7.3	55.5	13.1	.450	4.97	.70	.66
10	64.2	6.0	59.4	10.8	.513	5.63	.42	.70
11	62.3	7.2	56.5	13.0	.465	.12	.76	.66
12	62.4	6.1	57.5	11.0	.491	.31	.34	.69
13	62.2	6.9	56.7	12.4	.469	.16	.62	.66
14	63.0	6.5	57.8	11.7	.486	.35	.53	.68
15	62.9	5.5	58.5	9.9	.498	.49	.13	.72
16	61.7	6.4	66.6	11.5	.467	.15	.40	.68
17	61.4	6.1	56.5	11.0	.465	.14	.28	.69
18	60.1	6.5	54.9	11.7	.441	4.88	.33	.68
19	60.0	5.9	55.3	10.6	.447	.96	.10	.70
20	62.2	5.5	57.8	9.9	.486	5.37	.09	.72
21	61.7	5.6	57.2	10.1	.476	.26	.11	.71
22	61.2	6.6	55.9	11.9	.456	.04	.44	.67
23	61.0	6.3	56.0	11.3	.458	.07	.30	.69
24	60.7	5.9	56.0	10.6	.458	.07	.14	.70
25	60.5	5.8	55.9	10.4	.456	.06	.09	.71
26	60.4	6.3	55.4	11.3	.449	4.97	.26	.69
27	60.8	5.5	56.4	9.9	.464	5.14	.01	.72
28	61.9	5.6	57.4	10.1	.480	.30	.12	.71
29	62.3	5.4	58.0	9.7	.489	.40	.06	.72
30	62.0	6.0	57.2	10.8	.476	.25	.28	.70
31	61.6	5.8	57.0	10.4	.473	.23	.16	.71

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.019	30.138	29.915	0.223	65.3	71.0	61.5	9.5
1	.009	.116	.896	.220	64.7	70.5	60.4	10.1
2	.002	.103	.881	.222	64.0	70.2	59.5	10.7
3	29.993	.090	.867	.223	63.4	69.7	59.0	10.7
4	.989	.076	.870	.206	62.8	69.4	58.5	10.9
5	30.001	.094	.888	.206	62.2	68.8	57.6	11.2
6	.018	.116	.918	.198	61.7	68.8	57.3	11.5
7	.040	.133	.945	.188	61.6	69.0	57.7	11.3
8	.067	.155	.961	.194	63.9	71.3	60.8	10.5
9	.090	.185	.985	.200	67.9	74.3	62.8	11.5
10	.090	.179	.986	.193	71.6	77.0	66.0	11.0
11	.072	.175	.967	.208	74.3	80.0	70.0	10.0
Noon.	.043	.152	.942	.210	76.3	82.5	72.5	10.0
1	.005	.117	.900	.217	77.4	83.5	74.3	9.2
2	29.980	.080	.879	.201	78.2	84.2	75.2	9.0
3	.965	.063	.872	.191	78.1	83.9	75.3	8.6
4	.961	.056	.874	.182	76.8	82.6	73.7	8.9
5	.969	.060	.872	.188	75.0	80.5	72.2	8.3
6	.981	.082	.877	.205	72.4	77.5	69.0	8.5
7	.997	.102	.899	.203	70.5	75.7	67.5	8.2
8	30.014	.129	.915	.214	69.1	74.3	66.2	8.1
9	.028	.145	.924	.221	67.9	73.0	64.8	8.2
10	.037	.153	.935	.218	66.8	72.2	63.8	8.4
11	.031	.149	.926	.223	65.9	71.7	62.7	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	61.9	3.4	59.2	6.1	0.509	5.66	1.27	0.82
1	61.4	3.3	58.8	5.9	.503	.58	.22	.82
2	60.9	3.1	58.1	5.9	.491	.46	.19	.82
3	60.4	3.0	57.7	5.7	.485	.39	.14	.83
4	59.9	2.9	57.3	5.5	.478	.33	.08	.83
5	59.3	2.9	56.7	5.5	.469	.23	.06	.83
6	59.1	2.6	56.8	4.9	.470	.26	0.93	.85
7	59.1	2.5	56.8	4.8	.470	.26	.91	.85
8	60.4	3.5	57.2	6.7	.476	.29	1.34	.80
9	62.4	5.5	58.0	9.9	.489	.40	2.11	.72
10	63.9	7.7	57.7	13.9	.485	.31	3.09	.63
11	65.0	9.3	58.5	15.8	.498	.42	.70	.59
Noon.	65.2	11.1	57.4	18.9	.480	.20	4.49	.54
1	65.4	12.0	57.0	20.4	.473	.13	.88	.51
2	65.5	12.7	56.6	21.6	.467	.05	5.20	.49
3	65.4	12.7	56.5	21.6	.465	.03	.19	.49
4	65.0	11.8	56.7	20.1	.469	.08	4.75	.52
5	65.6	9.4	59.0	16.0	.506	.51	3.80	.59
6	65.6	6.8	60.2	12.2	.527	.77	2.83	.67
7	64.9	5.6	60.4	10.1	.530	.83	.30	.72
8	64.3	4.8	60.5	8.6	.532	.86	1.92	.75
9	63.5	4.4	60.0	7.9	.523	.78	.73	.77
10	62.9	3.9	59.8	7.0	.520	.75	.51	.79
11	62.3	3.6	59.4	6.5	.513	.68	.38	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	137.8	...	N E & N by W	...	47.2	B to 1, \i to 6, B to 11 P. M. Slightly foggy from 8 to 10 P. M.
2	138.1	...	S W & W S W	...	80.6	B.
3	139.0	...	S W & N W	...	103.5	B to 11 A. M., \i to 3, B to 11 P. M. Slightly foggy from 8 to 11 P. M.
4	135.5	...	W N W & N by E	...	61.7	B. Slightly foggy at Midnight & 1 A. M. & from 7 to 10 P. M.
5	137.0	...	N	...	105.8	B to 3 A. M., \i to 5, B to 9, \i to 11 P. M. Slightly foggy at 9 P. M.
6	134.0	...	N N E & N W	...	92.7	B to 4, \i to 10 A. M., \i to 6, B to 11 P. M. Slightly foggy at Midnight & from 8 to 11 P. M.
7	137.0	...	N & N by E	...	86.7	B to 6 A. M., \i to 1, \i to 5, B to 11 P. M. Slightly foggy at 10 P. M.
8	133.0	...	N & N N W	...	86.6	B to 3 A. M., \i to 9, B to 11 P. M. Slightly foggy from Midnight to 3 & at 7 A. M.
9	129.0	...	N & N by E	...	140.6	B to 10 A. M., \i to 5, \i to 11 P. M.
10	135.0	...	N by E & N N E	...	178.4	B to 7 A. M., \i to 2, B to 8, \i to 11 P. M. Slightly foggy at 7 & 8 P. M.
11	137.2	...	N & N by E	...	131.1	B to 4 A. M., \i & \i to 6, B to 11 P. M.
12	138.0	...	N by E & N by W	...	162.5	\i to 2 A. M., B to 11 P. M.
13	130.5	...	N by E & N	...	86.9	B.
14	133.0	...	N N W & N by E	...	143.6	\i to 1 A. M., B to 7, \i to 11 P. M. Slightly foggy at 11 P. M.
15	131.0	...	N N E	...	109.5	\i to 2 A. M., \i to 12, \i to 2, B to 11 P. M. Slightly foggy at Midnight & from 8 to 11 P. M.
16	130.5	...	N N E & N by W	...	76.6	B. Slightly foggy from Mid- night to 2 A. M.
17	133.0	...	N by W & S S W	...	97.6	B to 12, \i to 2, B to 11 P. M. Slightly foggy at 10 & 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		h	Miles.	
18	125.2	...	E by S, S W & [N W	...	63.4	B. Slightly foggy at Midnight & 1 A. M.
19	127.0	...	N W & N N E	...	95.2	B. Slightly foggy at 11 P. M.
20	131.5	...	W S W & N	...	65.3	Chiefly B. Slightly foggy from Midnight to 3 & at 7 A. M.
21	128.0	...	N by E & W by S	...	75.6	B.
22	132.0	...	W by S & N W	...	56.9	B. Slightly foggy at 9 P. M.
23	130.0	...	N N E & N	...	131.8	B to 12, \i to 2, B to 11 P. M.
24	125.9	...	N by E & W	...	85.4	B. Slightly foggy at 6 A. M. 8 & 9 P. M.
25	129.8	...	W N W & S W	...	60.1	B to 12, \i to 3, B to 11 P. M. Slightly foggy at 9 P. M.
26	128.0	...	N E & N W	...	89.3	B. Slightly foggy from 8 to 11 P. M.
27	130.5	...	S W, S [W by S S W &	...	53.7	B to 5, \i to 7 A. M., B to 11 P. M. Slightly foggy from Midnight to 8 A. M. & 7 to 11 P. M.
28	129.0	...	S W	...	37.5	B. Foggy from Midnight to 7 A. M. & 8 to 11 P. M.
29	130.8	...	S by W & N N W	...	38.5	B. Slightly foggy from Midnight to 9 A. M. & 9 to 11 P. M.
30	129.0	...	N N W & N N E [W S W	0.2	71.3	B. Slightly foggy at 6 & 7 A. M.
31	132.0	...	E N E, N W &	...	105.7	B.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, ~i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	30.017
Max. height of the Barometer occurred at 9 A.M. on the 24th ...	30.185
Min. height of the Barometer occurred at 3 A.M. on the 5th ...	29.867
Extreme range of the Barometer during the month ...	0.318
Mean of the daily Max. Pressures ...	30.092
Ditto ditto Min. ditto ...	29.959
Mean daily range of the Barometer during the month ...	0.133

	°
Mean Dry Bulb Thermometer for the month ...	69.1
Max. Temperature occurred at 2 P.M. on the 3rd ...	84.2
Min. Temperature occurred at 6 A.M. on the 19th ...	57.3
Extreme range of the Temperature during the month ...	26.9
Mean of the daily Max. Temperature ...	78.4
Ditto ditto Min. ditto, ...	61.5
Mean daily range of the Temperature during the month ...	16.9

Mean Wet Bulb Thermometer for the month ...	62.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.2
Computed Mean Dew-point for the month ...	57.9
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.2

	Inches.
Mean Elastic force of Vapour for the month ...	0.488

	Troy grain.
Mean Weight of Vapour for the month ...	5.37
Additional Weight of Vapour required for complete saturation ...	2.41
Mean degree of humidity for the month, complete saturation being unity ...	0.69

	°
Mean Max. Solar radiation Thermometer for the month ...	132.2

	Inches.
Rained no days,—Max. fall of rain during 24 hours ...	Nil
Total amount of rain during the month ...	Nil
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	Nil
Prevailing direction of the Wind ...	N. & N. W.

\* Height 70 feet 10 inches above ground.

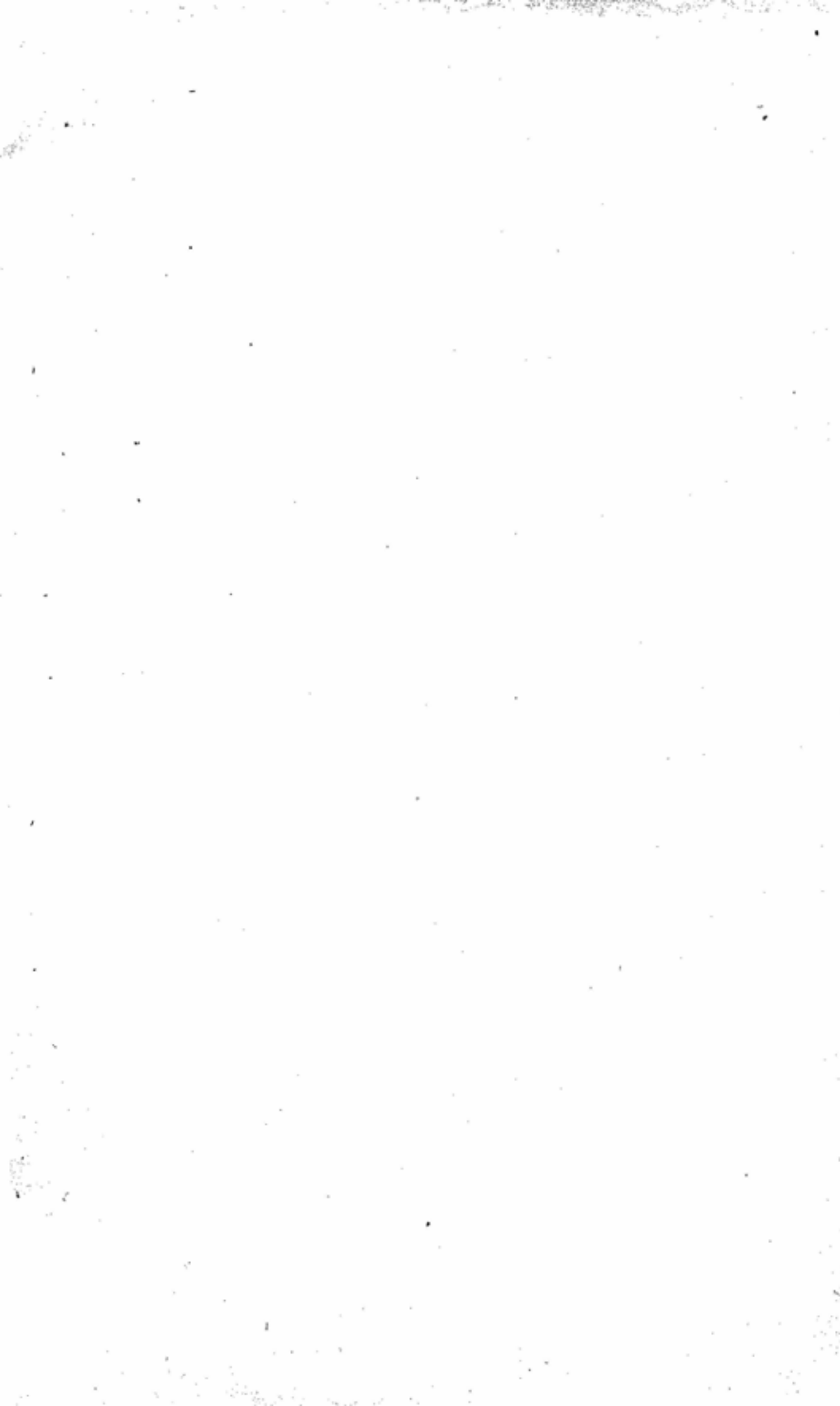
*Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month Dec. of 1875.*

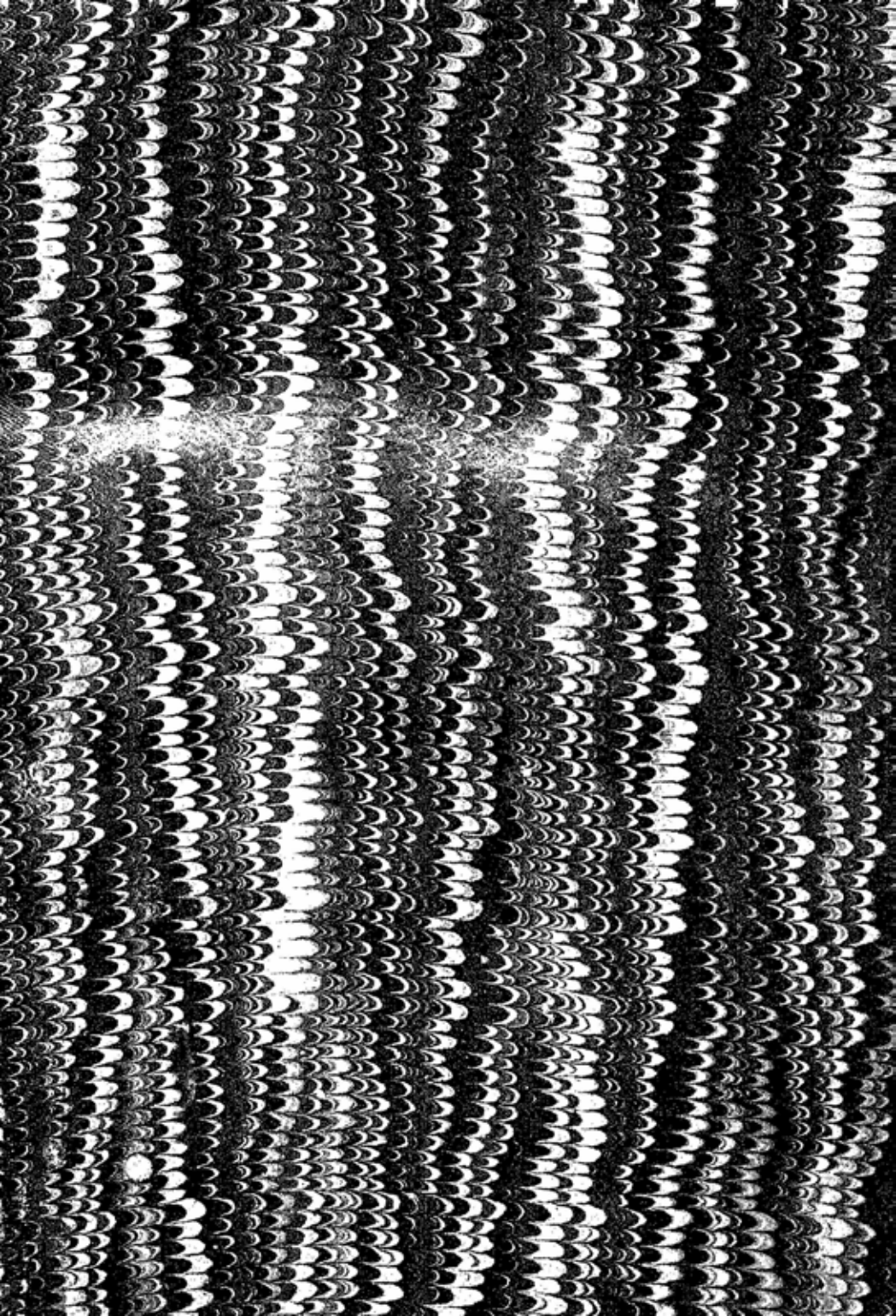
# MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. by E.	Rain on.	N. N. E.	Rain on.	E.	Rain on.	E. by S.	Rain on.	E. S. E.	Rain on.	S. E.	Rain on.	S. S. E.	Rain on.	S. by E.	Rain on.	S.	Rain on.	S. by W.	Rain on.	S. S. W.	Rain on.	S. W.	Rain on.	W. S. W.	Rain on.	W. by S.	Rain on.	W.	Rain on.	W. N. W.	Rain on.	N. W.	Rain on.	N. N. W.	Rain on.	N. by W.	Rain on.	N.
Midnight	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
11	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Noon.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
11	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5









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